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ARMOR IN VIETNAM

By

FREDERICK EUGENE OLDINSKY

THESIS

Presented to the Faculty of the Graduate School of
Trinity University in Partial Fulfillment
of the Requirements

For the Degree of

Master of Arts



TRINITY UNIVERSITY
May, 1976

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ABSTRACT OF THESIS

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This thesis begins with a brief history of armored vehicles from their earliest concepts to the modern battle tank of today. It critically examines the decision not to include tank units with the first American combat forces deployed in Vietnam and the irrationality of that decision in light of a similar decision made prior to the Korean conflict.

Tanks were deployed in limited numbers in Vietnam in spite of a decision to the contrary and, once there, proved their usefulness and their ability to perform in a tropical environment against an elusive enemy. Examples of the tank's effectiveness in Vietnam are given and the feasibility of deploying major armored forces to that country is discussed.

Problems created by insufficient armor are addressed as well as the limitations and vulnerabilities of tanks and other armored vehicles.

Armor doctrine is traced from the tank's role in breaking the stalemate of World War I through the formative years of World War II, and its application to the war in Vietnam.

Since most armored weapons were designed primarily for conventional warfare, a number of modifications were required to adapt the weapons to an unconventional war. Some of the more significant modifications are described.

Finally, lessons learned by the Vietnam experience and their future application are discussed. Concluding consideration in the paper is whether or not decision makers will heed these lessons learned or continue to make the same mistakes.

ACKNOWLEDGEMENTS

I wish to express my appreciation to those who devoted so much of their time and effort to assist me not only in the completion of this thesis but especially in my studies at Trinity preceding the thesis.

In particular I wish to thank Dr. Noel F. Parrish for his considerable guidance which led to the selection of my thesis topic and for his patience and counseling through the many stages of thesis development.

I especially wish to thank Dr. James H. Mannock who devoted an inordinate amount of time and effort to assist me in my writing and research and the attainment of my goal.

I am also indebted to Dr. Joe C. Ashby for taking time from his busy schedule to sit on my Thesis Committee.

Without the assistance of Mr. John Campbell and the staff of the Patton Museum at Fort Knox, the research for the thesis would have been much more difficult. To them and LTC George Dramis who made the Armor Monograph files available to me I offer my heart felt thanks.

Many others, too numerous to mention, rendered invaluable assistance in the completion of this thesis. To one and all I shall always be grateful.

TABLE OF CONTENTS

	Page
LIST OF FIGURES	iv
LIST OF PLATES	vii
 Chapter	
I. BACKGROUND	1
Early Concepts	1
World War I	2
World War II	4
Armor in Korea	10
Korea to Vietnam	13
II. FIGHTING IN VIETNAM	17
The French Experience	17
French Lesson Learned	19
The American Experience	20
The Need for Tanks--Limited Build-up	35
Organizational Considerations	42
Problems Caused by Insufficient Armor	46
Supply and Maintenance Support	60
Considerations for an Armored Division	66
Armored Cavalry Regiments--Another Option	69
Armor's Performance in Vietnam	84
Armor Employment by VC/NVA Forces	115
III. LESSONS LEARNED--CONCLUSIONS	125
BIBLIOGRAPHY	129
GLOSSARY	135
 Appendix	
A. Capabilities and Limitations of Armor	159
B. Armor Doctrine	168

Appendix

C. Attitude of the Infantry	182
D. Equipment Modifications in Vietnam	188
E. Plates	196
VITA	231

LIST OF FIGURES

Figure	Page
1. Map of South Vietnam Showing Province Boundaries and Corp Tactical Zones . .	22
2. Map of Vin Thanh Valley, South Vietnam . .	27
3. Map of Soui Ca Valley, South Vietnam . . .	28
4. Map Showing Location of Plei Me Special Forces Camp	29
5. Map Showing Area of Operation Circle Pines Near Cu Chi, South Vietnam . . .	33
6. Schematic Diagram of the Elements of the Division Base Organization	45
7. Schematic Diagram of Armored, Infantry and Mechanized Infantry Division Organization	45
8. Illustration of Tank Platoon Movement by Bounds	49
9. Map Showing Location of 2d Battalion, 34th Armor, in War Zone "C", February 1968	50
10. Map Depicting the Vicinity of Cu Chi Including the Hobo Woods, 25th Infantry Division Base Camp FSB Crockett and Tan Hoa	54
11. Map of South Vietnam Indicating Location of Lang Vei Special Forces Camp and all Major Actions Depicted in the Text	57
12. Map of South Vietnam Showing Location of Major Free World Ground Forces, Particularly Phu Bai, Location of Displaced Company C, 2d Battalion, 34th Armor	61

Figure	Page
13. Map of South Vietnam Showing Geomorphic Regions Which Illustrate How the Monsoon Season Affects the Northern Area at a Different Time from the Southern Area	68
14. Table of Percentages of Trafficability in the Four Corps of South Vietnam for Tanks and Armored Personnel Carriers During the Wet and Dry Season	70
15. Trafficability Map of I Corp, Dry Season .	71
16. Trafficability Map of I Corp, Wet Season .	72
17. Trafficability Map of II Corp, Dry Season	73
18. Trafficability Map of II Corp, Wet Season	74
19. Trafficability Map of III Corp, Dry Season	75
20. Trafficability Map of III Corp, Wet Season	76
21. Trafficability Map of IV Corp, Dry Season	77
22. Trafficability Map of IV Corp, Wet Season	78
23. Map Depicting U.S. Incursion into Cambodia	81
24. Schematic Diagram of the Organization of an Armored Cavalry Regiment	83
25. Illustration of Armored Column Formation	91
25A. Illustration of Armored Line Formation	92
26. Illustration of Herringbone Formation . . .	97

Figure	Page
27. Map Showing 11th ACR Base Camp, Xuan Loc and Ambush Site of 31 Decem- ber 1967	98
28. Map Depicting Location of Ap Bau Bang	102
29. Diagram of Battle of Ap Bau Bang	104
30. Map Showing Location of FSB Gold	107
31. Diagram of Battle of FSB Gold and Location of Samat Stream	109
32. Map Showing Location of Lang Vei Special Forces Camp	117
33. Map Showing Location of Ben Het Special Forces Camp	120
34. Map Showing Location of 20th ARVN Tank Regiment and Advance of NVA Armor Column	123

LIST OF PLATES

Plate	Page
1. Da Vinci's "Coolie Hat"-Shaped War Wagon	197
2. French Renault FT Light Tank of World War I	197
3. British Mark V Heavy Tank of World War I	198
4. M4A3E8 U.S. Medium Tank in Roadblock Position during World War II in Belgium (See Glossary, Tanks)	199
5. M-24 U.S. Light Tank Used in World War II and Korea (See Glossary, Tanks)	200
6. M-26 U.S. Medium Tank Used in World War II and Korea (See Glossary, Tanks)	201
7. M-46 U.S. Medium Tank Used in World War II and Korea (See Glossary, Tanks)	202
8. T-34 Russian Medium Tank Used in World War II, Korea and Vietnam (See Glossary, Tanks)	203
9. M-75 Armored Personnel Carrier--First Fully Protected Infantry Carrier. Developed in Early 1950's. Replaced the World War II Half-Track	204
10. M-59 Armored Personnel Carrier--Replaced the M-75 in the Mid-1950's. Both Vehicles have similar characteristics except for the power train	205
11. M48A3 U.S. Medium Tank, Used by U.S. Tank Battalion and Armored Cavalry Units in Vietnam (See Glossary, Tanks)	206

Plate	Page
12. M-88 Medium VTR Shown Hoisting the Turret of an M-4 Tank. Standard Tank Retriever in the Army Today (See Glossary, Armored Vehicles) . . .	207
13. Armored Vehicle Launch Bridge (AVLB) (See Glossary, Armored Vehicles) . . .	208
14. M-578 Light VTR Used by Mechanized Infantry, Armored Cavalry and Some Artillery Units. These units are equipped with tracked vehicles not requiring the power of the M-88 VTR .	209
15. M-551 Armored Reconnaissance Airborne Assault Vehicle (AR/AAV) Sheridan. Used extensively by armored cavalry units in Vietnam (See Glossary, Tanks)	210
16. M60A1 Main Battle Tank Currently Stan- dard Equipment in U.S. Tank Batta- lions--Some of these tanks were used by Israel effectively against the Arabs	211
17. M-728 Combat Engineer Vehicle (CEV), Organic to Combat Engineer Batta- lions--This multipurpose vehicle has a 165 mm demolition gun, a dozer capability and can hoist loads with its A-frame. Saw action in Vietnam	212
18. Mechanized Infantry Aboard M113A1 APC's on a Mission in Vietnam Just North of Tay Ninh	213
19. A Soviet-built PT-76 Light Amphibious Tank Destroyed during the Battle of An Loc, South Vietnam (See Glossary, Tanks)	214
20. A Soviet-built T-54 Medium Tank Des- troyed at An Loc, South Vietnam (See Glossary, Tanks)	215

Plate	Page
21. An M48A3 Tank Securing Rome Flow Operations in the Hobo Woods North of Cu Chi, South Vietnam (See Page 192, Rome Flow)	216
22. Russian Soldier with RPG-2 Ready for Firing (See Glossary, Weapons)	217
23. M48A3 Tank on Search and Destroy Operations in Vietnam--Note extra track blocks on turret and pedestal-mounted caliber .50 machine gun	218
24. M-88 VTR in South Vietnam	218
25. M48A3's on a Mission in Vietnam Showing Extra Track Blocks of Additional RPG Protection and Externally-Mounted Caliber .50 Machine Gun	219
26. M113A1 Marginal Terrain Assault Bridge (MTAB) in Vietnam with Bridge in Raised Position (See Glossary, Armored Vehicles)	220
27. M113A1, ACAV (See Glossary, Armored Vehicles)	221
28. PT-76 Soviet Light Amphibious Tank Crossing a Canal (See Glossary, Tanks)	221
29. M113A1, ACAV, Top View	222
30. PT-76 Destroyed at An Loc, South Vietnam .	223
31. Capstan Adapted to Sprocket of M113A1 APC in Vietnam (See Page 191)	224
32. M113A1 APC Pulling Itself from a Ditch Using Capstan Kit	224
33. Rome Flow Cutting Trees in Vietnam (See Page 192)	225

Plate	Page
34. Rome Plows in Assembly Area Secured by Tanks in Vietnam	225
35. Scorpion Mine Exploder Using an M-4 Tank Chassis with Flail Device Mounted in Front--Used in World War II	226
36. Marquis Mine Exploder, a World War II Vehicle on an M-4 Tank Chassis with a Flail Device Mounted on the Front . .	226
37. T9E1 Mine Exploder Fitted to M-4 Tank in World War II	227
38. T1E3 Mine Exploder in World War II Pushed by an M-4 Tank	227
39. M-36 U.S. Tank Destroyer Used in World War II by Tank Destroyer Battalions and in Vietnam by the French Expe- ditionary Force (See Glossary, Tanks)	228
40. M-8 U.S. Armored Car Used by Reconnaiss- ance Units in World War II and in Vietnam by the French	228
41. Shillelagh Missile Being Launched from an M-551 Sheridan During Test at White Sands Missile Range (See Glossary, Ammunition)	229

I. BACKGROUND

Early Concepts

Man is inquisitive and inventive. He has used these traits not only to make his life easier and more comfortable but also to improve his ability to defeat his enemies. He has sought the means by which to inflict injury upon his opponent while protecting himself from harm. Relatively simple protective devices such as a shield and body armor soon evolved, and applied in mounted combat to protect the horse and the chariot. One of the earliest recorded uses of armor appears in the Bible in the Book of Judges, Chapter 1, 19th verse: "And the Lord was with Judah, and he drove out the inhabitants of the mountains but could not drive out the inhabitants of the valley because they had chariots of iron."

Over the centuries there were a number of innovations in very rudimentary vehicles which relied on horse or manpower for their mobility, and wood, leather or metal for protection from enemy weapons. One of the most notable of these was a covered chariot designed by Leonardo Da Vinci in a shape similar to a Chinese coolie hat. The most significant aspect of Da Vinci's vehicle was its intended use. He visualized this chariot attacking and "...behind them the infantry can follow in safety and

without opposition..."¹ This tactic closely resembles a method of employment in World War I where the tanks would move forth "...flattening the barb wire for the Infantry advance and directing fire against hostile machine gun nests."² A similar tactic is used today in certain situations.

World War I

There was a serious attempt by James Cowan, an Englishman, to develop an armored fighting vehicle in the nineteenth century but limited technology and a reluctance to try new weapons doomed this early effort to failure. When World War I bogged down to trench warfare the desperate need for a weapon to defeat the machine gun and restore mobility to the battlefield led to the successful development of the tank. The idea of using an American-made Holt caterpillar tractor equipped with armor plate was posed by British Lieutenant Colonel Ernest D. Swinton to the Committee of Imperial Defense. This Committee rejected

¹Special Text 17-12, History and Role of Armor, U.S. Army Armor School, Fort Knox, KY, April 1974, p. 2.

²Skillman, Willis Roweland, The A.E.F., George W. Jacobs & Company, Philadelphia, PA, 1920, p. 41.

³Special Text 17-12, History and Role of Armor, U.S. Army Armor School, Fort Knox, KY, December 1971, p. 2.

Swinton's proposal but the First Lord of the Admiralty, Winston Churchill, supported the idea and formed a committee within the Royal Navy to develop the tank.⁴

The first tanks were committed to battle on September 15, 1916, by the British against the Hindenburg line.⁵ Success in this first battle was limited by mechanical failures and lack of training and experience on the part of the crews. They did accomplish a great deal, however, by breaking through the German lines and inflicting a great number of casualties.

The first large scale employment of tanks occurred on November 20, 1917, in the attack on Cambrai where the British used 378 tanks along a seven mile front. The tanks were followed by six infantry divisions, and a penetration nearly six miles deep was made into the German lines.⁶

After only one year of service the tank had proven its effectiveness and had become a desirable weapons system. During the Meuse-Argonne campaign on September 26,

⁴Hart, B. H. Liddell, The Tanks, Vol. I, 1914-1939, Frederick A. Praeger, New York, 1959, p. 18.

⁵Whitehouse, Arch, Tank, Modern Literary Editions Publishing Company, New York, 1960, p. 32.

⁶Jones, Ralph E., The Fighting Tanks Since 1916, National Service Publishing Company, Washington, D.C., 1933, pp. 21-26.

1918, General John J. Pershing, Commander of the American Expeditionary Forces (AEF) in Europe, offered "...anything in the AEF for 500 additional tanks."⁷ By the end of the war, only fourteen months after the tank was introduced, the Germans, French, British, and Americans had used the tank in 91 engagements.⁸ The tank had proved its worth. It had restored mobility to the battlefield and had contributed significantly to the allied victory. A tribute was paid to the tank when General von Ludendorff of the German High Command praised the allied tanks as being a principal factor in Germany's defeat. It is also a tribute to the tank's success that it was one of the weapons systems denied the Germans by the Treaty of Versailles.⁹

World War II

Development of the tank after World War I was slowed by budget restrictions and by disagreement as to the tank's role in any future war. As in World War I it was considered just another infantry weapon and

⁷Gillie, Mildred Hanson, Forging the Thunderbolt, The Military Series Publishing Company, Harrisburg, PA, 1947, p. 15.

⁸Special Text 17-12, History and Role of Armor, U.S. Army Armor School, Fort Knox, KY, April 1974, p. 5.

⁹Macksey, Kenneth, and Batchelor, John H., Tank, A History of the Armoured Fighting Vehicle, Charles Scribners Sons, New York, 1970, p. 37.

conventionalists in positions of power worked to keep it in that role. More farsighted men, both in the U.S. and abroad, visualized the tank in a much more prominent and decisive role. Colonel J. F. C. Fuller and Captain Liddell Hart of Great Britain, General Adna R. Chaffee of the U.S., and General Heinz Guderian of Germany, thought the tank should be employed in mass formations with the infantry in a supporting role. They also advocated the combined arms concept of tanks, infantry, artillery and air support.

While the invention of the tank and its subsequent technological improvements in firepower, mobility, and armor protection, are important, the manner in which the tank was employed is equally important in the history of ground warfare.

It was largely through the efforts of the aforementioned men that the tank was raised from the slow-moving, secondary weapons-system role of infantry support to the fast-moving primary role of breakthrough and exploitation through the use of tank-heavy combined arms formations. These men opened the way in peacetime with the ideas that were later used in war by such outstanding armor commanders as General George S. Patton, General Creighton W. Abrams, and General Bruce C. Clarke.

One of the first men to recognize the tactical

value of the tank was Fuller, then a member of the British Tank Corp's Staff. He devised a plan in which the tank would play the major role of breaking through the main defenses. Other tanks, followed by motorized infantry, would drive deep into the enemy rear to destroy his headquarters and supply installations and disrupt his communications. Fuller called this concept "The Morcellated Attack."¹⁰ This same tactic exists today in the doctrine of tank warfare.

Captain B. H. Liddell Hart, another British officer wrote the book on tank tactics which, along with Fuller, inspired the great German armor leader, General Heinz Guderian.¹¹ Hart advocated the concentration of tanks and their use for long range thrust. Again, a tactic current today.

While these two British officers were theorists, it was Guderian who put their theory into practice. Guderian must be credited with the development of modern armor doctrine as it was used in World War II and as it is essentially known today. Guderian had to overcome the prejudicial attitude of the firmly entrenched infantry and

¹⁰ Macksey, Kenneth, and Batchelor, John H., Tank, A History of the Armoured Fighting Vehicle, Charles Scribners Sons, New York, 1970, p. 48.

¹¹ Guderian, Heinz, Panzer Leader, Ballentine Books, Inc., New York, 1957, p. 10.

cavalry officers on the German General Staff to make progress in the formation of an armored force. These two branches had long reigned supreme as the primary combat arms branches and did not relish the thought of a new branch usurping their positions. Against great odds, Guderian succeeded in establishing armor units. Small units at first, and, as the tanks proved themselves, larger units, to include tank armies, were formed.

Tank advocates in the United States were faced with virtually the same problems as Guderian. Infantry and cavalry officers worked to keep the tank in a minor role as an infantry support weapon and tank development was kept at the short end of the budget stick. The American Tank Corps which had been formed in 1917 was disbanded by the National Defense Act of June 4, 1920, and the tank was assigned to the Chief of Infantry.¹² It wasn't until 1928 that a mechanized force was formed to experiment with the tank and other combined forces. Although the first experiments failed because of the use of outdated and broken-down equipment, public pressure caused the War Department to give its mechanized force another chance. It was at this point that Adna R. Chaffee, who

¹²Gillie, Mildred Hanson, Forging the Thunderbolt, The Military Series Publishing Co., Harrisburg, PA, 1947, p. 15.

later became known as the "Father of Armor," first became involved with the armored force. As a member of the General Staff, Chaffee, then a major, outlined the plans which formed the basis for the modern tank force and combined arms team. Tank development still progressed very slowly until impetus was provided by the German invasion of Poland in 1939 and the invasion of France in 1940. The action in France was most significant because it was here that tanks were used in mass formation for the first time and established the tactics and doctrine for tank employment that would be used throughout the remainder of World War II. It was also this action which spurred the U.S. to create an armored force in July 1940, with the role of the tank greatly expanded.¹³

The United States entered World War II with a meager armored force but the success of the German panzer divisions in Africa and Europe served notice to the armies of the world that the tank was a weapon to be reckoned with. Even the staunchest opponent of the tank now realized that dismounted infantry was no match for a massed tank assault. Thus the U.S. military-industrial complex moved into high gear to design, test and produce effective tanks.

¹³Greenfield, Kent Roberts, The Army Ground Forces, The Organization of Ground Combat Troops, Historical Division, Department of the Army, Washington, D.C., 1947, p. 56.

World War II saw the tank being used in almost every conceivable role and in all types of terrain and climate. On the plains of Central Europe and the deserts of North Africa the tank was king. It was the weapon which led the attack, broke through every line and pushed the enemy all the way to their homeland. In the Pacific theater of operations the tank played the supporting role in dense jungles and mangrove swamps where massed tank formations were impractical if not impossible. This supporting role was no less important since the tank in the tropics provided essentially the same support to the infantry as their ancestors had provided in World War I. They destroyed enemy bunkers and machinegun emplacements, tripped booby traps that would have been fatal to infantry, and in general provided overall protective fire for infantry assaults.

By the end of the Second World War, Armor was a well established, firmly entrenched branch of the Army and horse cavalry was a thing of the past. The combined arms concept of tanks, infantry, self-propelled artillery, engineers and signal had proven to be the soundest method of employment as advocated by General Chaffee. The cavalry was now mounted in armored vehicles and infantry working with tanks rode in armored half-tracks. The tank had come into its own.

Armor in Korea

Even though the tanks emerged from World War II as the Army's primary ground assault weapon, there were still those who did not fully understand the capabilities, limitations, and principles of employment of the tank. With few exceptions, the news coverage of the war in Europe always pictured the tank roaring across wide-open fields in the finest tradition of the classic cavalry charge and this impression, unfortunately, remained with many of the non-armor army officers to the point that only wide-open, gently rolling terrain was "tank country" and a battlefield with hills, woods, and rivers was trafficable only to infantry.

Such a misunderstanding of the tanks capabilities nearly proved disastrous for the South Korean and American armies in the early days of the Korean conflict. After the U.S. forces withdrew from Korea in 1949, Korean President Syngman Rhee made an urgent request to President Truman for additional military aid. In October of the same year, the Korean Minister of National Defense asked for 189 M-26 tanks. The Deputy Chief of the U.S. Military Advisory Group in Korea, Colonel William H. Sterling Wright, advised the Army Chief of Staff, General J. Lawton Collins, against fulfilling the request. Wright's

opinion was: "The rough terrain, poor and primitive bridges militated against efficient tank operations."¹⁴

The error of Wright's judgement contributed greatly to the early defeat of the U.S. and South Korean armies by the invading North Korean troops. The North Korean arsenal included the Russian-made T-34 tanks against which the South Koreans and the U.S. troops had no defense save some aircraft. The need for U.S. tanks was well stated by Major General William F. Dean, Commanding General, U.S. Forces in Korea, in a letter to General Douglas MacArthur on July 8, 1950. Dean advised MacArthur that North Korean armor had proven extremely effective. In their first engagements, his troops, Dean pointed out emphatically, could not stop enemy tanks:

The 2.36 inch rocket launcher proved dangerously disappointing against the enemy's heavily armored Russian tanks. The launcher was ineffective against the front and side armor, and American infantrymen quickly lost confidence in it. Direct fire by artillery was of little help after the pitifully few 105 mm antitank rounds available at the guns were exhausted. Regular high-explosive projectiles...would not penetrate armor deeply enough
....¹⁵

He described enemy tank tactics as excellent and unusually

¹⁴Schnabel, James F., United States Army in the Korean War, Policy and Direction: The First Year, Office of the Chief of Military History, United States Army, Washington, D.C., 1972, p. 36.

¹⁵Ibid., p. 84.

effective despite terrain which confined tanks mainly to roads. Asserting that "...we cannot afford to be out-gunned and out-armored...", the hard-pressed American general appealed for American medium tanks and for 90 mm towed antitank guns.¹⁶

Once again, as in World War II, the enemy had proven to be more knowledgeable in tank warfare than the Americans, and once again the American had to play "catch-up." Tanks were brought to Korea as the build-up of American and other United Nations forces progressed and eventually the North Korean armor threat was eliminated, but not before the United States had learned another valuable lesson in tank employment. They learned that tanks could be employed effectively in practically any type terrain and they were again reminded that an Army without tanks or effective antitank weapons stood very little chance of stopping an army with tanks. This second point also served to demonstrate the tank's effectiveness in the anti-personnel role as well as the antitank role. All of these lessons were, unfortunately, forgotten when U.S. forces were committed to the Republic of Vietnam some twelve years later.

¹⁶Schnabel, James F., United States Army in the Korean War, Policy and Direction: The First Year, Office of the Chief of Military History, United States Army, Washington, D.C., 1972, p. 84.

A lesson the U.S. learned from Korea and did not forget was that tank research and development must continue in peacetime as well as in wartime if the U.S. Army was to have modern, effective equipment with which to fight a future war. The tanks used in Korea were primarily of World War II vintage consisting of the M-24 light tank and the M4A3E8 medium tank.

Later in the war the newest American tank, the M-46, with a 90 mm gun, was issued but there were only 314 of these tanks in the inventory when the war started.¹⁷ Budget constraints imposed by Congress had not only retarded the research and development effort but had also drastically reduced the procurement of tanks and spare parts to support the current tank inventory. After Korea, tank development and procurement was given a much higher priority.

Korea to Vietnam

The period between the Korean Conflict and America's involvement in Vietnam was one of great significance for tank development.

Technological improvements in fire control systems, range finders, armor design, night vision systems, and ammunition resulted in the development of a number of

¹⁷Schnabel, James F., United States Army in the Korean War, Policy and Direction: The First Year, Office of the Chief of Military History, United States Army, Washington, D.C., 1972, p. 46.

excellent tanks culminating in the present standard tank of the U.S. Armored Forces, the M60A1. Other breakthroughs in metallurgy and missile guidance systems resulted in the production of the world's first missile firing tank, the M-551 Sheridan, which has an aluminum hull and fires both the Shillelagh guided missile and conventional ammunition from the same gun. This period also saw the introduction of the first U.S. armored personnel carrier, designed to allow the infantry to follow the tanks while mounted and protected from small arms fire and artillery shell fragments. The present version of this vehicle is the M-113 Armored Personnel Carrier which played a major role in the armor team in Vietnam.

Great progress was made in the weapons with which U.S. armored troops would be equipped, but their method of employment remained as in World War II, except for changes necessitated by the advent of nuclear weapons. The Command and Staff Department of the U.S. Army Armor School was still fighting World War II in Europe and Africa and the lessons of Korea were all but ignored. The experience of armor in jungle warfare in the Pacific theater of World War II was completely ignored except for its incidental inclusion in some historical example of airborne, amphibious or infantry operations. This situation was due in no small part to the fact that the successful armor leaders

of World War II were now the ranking generals in the U.S. Armor Forces and the classes were as much a monument to their careers as a teaching vehicle for the armor school faculty. It was also paradoxical that the student was given a historical example to study prior to a given class in tactics, yet if the student solution in any way reflected the tactics of the successful battle the student was usually wrong.

In the Armor Officers' Career Course of 1964-65, which this writer attended, only one unit of instruction pertained to Korea and it contained very little on the use of armor there. Nothing was taught to help the student in combating mass human wave attacks against a defensive position when the defenders were outnumbered ten to one. Only nice, safe problems where the U.S. Forces had numerical superiority were taught.

Today, the tactical curriculum of the Armor School has improved considerably in the method used to prepare the student for a future war in Europe. The school no longer rehashes World War II experiences but instead teaches new tactics based on the estimated capabilities of the Warsaw Pact countries. There is still, however, nothing taught concerning the experience in Korea or the present

Chinese Communist threat.¹⁸

¹⁸Interview, LTC William W. Jones, Jr., Chief,
Advanced Tactics Division, Command and Staff Department,
U.S. Army Armor School, Fort Knox, KY, 9 December 1975.

II. FIGHTING IN VIETNAM

The French Experience¹⁹

France was the first western nation to employ armored forces in Vietnam. In nine years of fighting an insurgent enemy in a tropical environment, the French learned many valuable lessons. American forces could have benefited from the French experience but no one bothered to ask. Dien Bien Phu apparently led many to believe that the French had nothing to offer. This was a mistake. A loser may learn just as much as a winner, if not more. Even though the French agreed to a truce and pulled out of Vietnam, they won many battles against the insurgent enemy, especially with armor.

French contingents were present in Indo China as early as 1852, but it was not until 1884, after much fighting, that Vietnam became a French Colony. When the French surrendered to the Germans in Europe in 1940, the Japanese occupied Vietnam and remained there until their capitulation to the United States in 1945.²⁰ In October of that year, the French Expeditionary Force (FEF) landed in Indo

¹⁹ All information on the French Experience in Indo China, except where noted, is from briefing documents in the files of the French Liaison Office to the U.S. Army Armor School, Fort Knox, KY.

²⁰ Cheinski, Walter F., Country Study: Republic of Vietnam, The Military Assistance Institute, Department of Defense, Washington, D.C., 1965, p. 45.

China with the objective of reoccupying that entire area which now constitutes Laos, Cambodia and Vietnam. (Experience of French armor units apply almost equally to all three of these countries but only Vietnam will be considered in this paper).

Commander of the FEF, Lieutenant General LeClerc, was the former commander of the French Second Armored Division in 1944-45. LeClerc employed the same tactics in Vietnam that had been used successfully in Europe which resulted in heavy losses to the FEF armor units.

As the French gained experience in the use of armor, they changed their organization in 1951 to cope better with the terrain, the mission and the tactics of the insurgent Viet-Minh forces.²¹ Reorganization consisted of two different types of combined arms units. One type was an Armored Group (sousgroupements blindés or GB) which was comprised of one company of light tanks, (12 tanks and two half-tracks), and two mechanized infantry companies on half-tracks. Another type of organization was the Reconnaissance Group (groupes d'Escadrons de Reconnaissance or GER), comprised of one light tank

²¹Choinski, Walter F., Country Study: Republic of Vietnam. Viet-Minh was the name used by the guerilla forces in North Vietnam under the leadership of Ho Chi Minh. The South Vietnamese insurgents were trained by the Viet-Minh. p. 87.

company (M-24s), one armored car troupe (15 M8 armored cars and three howitzers) and one or two companies of indigenous forces. These organizations provided the French armor units greater flexibility and proved highly effective. A short-coming of the Armored Groups was the lack of sufficient infantry to conduct dismounted operations. Consequently, by 1954, the Armored Groups organization was expanded to include three companies of truck-mounted infantry, an 81 mm mortar platoon mounted in half-tracks, and an additional four tanks. Inherent capabilities of this combined arms team were further enhanced by this additional strength and many victories were won over the Viet-Minh; but the French were still plagued by a lack of tanks--the same problem which would hamper American efforts in the future.

At the time of the cease-fire in Vietnam, the French had four of these Armored Groups with which they performed road security and infantry support missions. They also had three of the previously mentioned GER or Reconnaissance Groups, one M-36 tank regiment and two Amphibious Groups. The Amphibious Groups were equipped with armored boats and amphibious tracked vehicles with which the French patrolled the rivers and inundated areas unsuitable for tanks.

French Lesson Learned

As mentioned earlier, the French learned many

lessons in the use of armor in Vietnam which the Americans failed to heed. It is not the intent of this brief sketch of the French experience to examine nine years of fighting in detail but rather to point out the conclusions indicated by this experience.

The salient point of the lessons learned by the French was the necessity to modify tactics to counter an insurgent enemy, i.e., conventional tactics were inappropriate in an unconventional war. They also learned that the basic combined arms team is still the best combat organization but an army must remain flexible enough to modify this concept when required by elements of the mission, enemy and terrain. But the most important lessons learned were that tanks can be used in most areas of the world and that there must be enough tanks to perform all the missions assigned. A few tanks spread too thinly must be expected to operate with reduced effectiveness. In this respect, the French concluded that one tank company (17 tanks) per infantry battalion was the minimum number for maximum effectiveness.

The American Experience

American troops were first committed to Vietnam

in August 1950 in an advisory capacity.²² A relatively small number of American troops were in country until 1965 when President Lyndon B. Johnson made the decision to commit U.S. forces in strength.

The first major army unit committed to Vietnam was the 173rd Airborne Brigade which arrived in Vietnam on 5 May 1965 from Okinawa. The 173rd was comprised of two infantry and one artillery battalions. Following the 173rd was a brigade of the 1st Infantry Division which arrived in mid-July and the 1st Brigade of the 101st Airborne Division which arrived in Vietnam on 27 July. The first full division to arrive in Vietnam was the air mobile 1st Cavalry Division which landed in Vietnam in late September 1965 with 16,000 men, 400 aircraft and 1,600 vehicles, and immediately established a base of operations in Pleiku province.²³ (Figure 1).

All of these first units committed to Vietnam were straight infantry. These troops were transported in helicopters and usually airlifted to the battle zone; however, once the troops dismounted from the aircraft, they were

²²Chronology of Significant Events, Armor Monograph files, Patton Museum, Fort Knox, KY.

²³Tolson, John J., Lieutenant General, Vietnam Studies, Air Mobility, 1961-1971, Department of the Army, Washington, D.C., 1973, pp. 63, 67-68.

three-mile per hour infantry troops. None of the units were equipped with armored vehicles.

As mentioned earlier in this paper, the Army, through experience, arrived at the combined arms concept of tank-infantry teams supported by aircraft, artillery, engineers and signal as the most effective fighting force. Yet, the first American units committed to Vietnam were committed without armor units. It is difficult to understand the shortsightedness of the Army planners in arriving at this type of organization to be deployed to a combat zone. It is true that a sense of urgency existed to get American units to Vietnam, however, the urgency was not so great that the 1st Cavalry Division was deployed by air. Except for a 1,000-man advance party, the entire division was transported by sea; therefore, deployment time did not prevent the division from taking armor with them.

Admittedly there was no known armor threat in Vietnam at the time of the U.S. intervention, but tank battalions would have given the U.S. forces a much greater edge over the Viet Cong and later, North Vietnamese Army opponents just as the North Korean Army had the edge over the South Koreans and Americans in the early stages of the Korean conflict. It must also be noted that the type

of units first deployed were the type that had enjoyed the least success in the past, namely airborne units. Airborne units are inherently the most lightly armed combat units because of their intended method of deployment by air. Units of this type in particular need more reinforcements than even a straight infantry division. This is not to say that many airborne units were never effectively employed in the past; but they were most effective when they were reinforced with armor and additional artillery and were not inserted into the battle zone by airdrop (e.g., 101st Airborne Division defense at Bastogne).

While the 1st Cavalry Division was designated as air mobile and not airborne the effect was essentially the same. The troops were moved to the battle area by helicopter instead of parachute, but they were just as lightly armed as airborne troops and had limited staying power in a prolonged fire fight without continuous resupply.

According to General William C. Westmoreland, Commander-in-Chief, U.S. forces in Vietnam at the time of the build-up, there were reasons other than terrain which led to the decision not to use armor in Vietnam. Westmoreland stated that he believed there would be a ceiling on the number of U.S. troops committed to Vietnam and he felt the organization that was used provided the

optimum mix for an effective combat organization. He also stated that the initial mission in Vietnam was to be a defensive one and that tanks would be wasted in a static position on the defense. Additionally, only Viet Cong guerillas were being encountered initially and it was believed that this elusive foe required only infantry to defeat them.²⁴

While there is absolutely no disrespect intended toward General Westmoreland, it appears that the rationale behind these reasons is faulty. Regardless of the number of units that were to be deployed to Vietnam, the optimum mix for a combat organization is still one which combines armor and infantry as the main maneuver element. The tank in the defense is still a highly effective weapon and much more responsive than dismounted infantry. For example, if tanks are employed in a perimeter defense the tank can be moved from one part of the perimeter to another, as the situation warrants, much faster and with greater protection, than a squad or platoon of dismounted infantry. Therefore, the tank is still utilizing its main characteristic of mobility, armor protection and fire-power even in the so called "static" defense. Furthermore

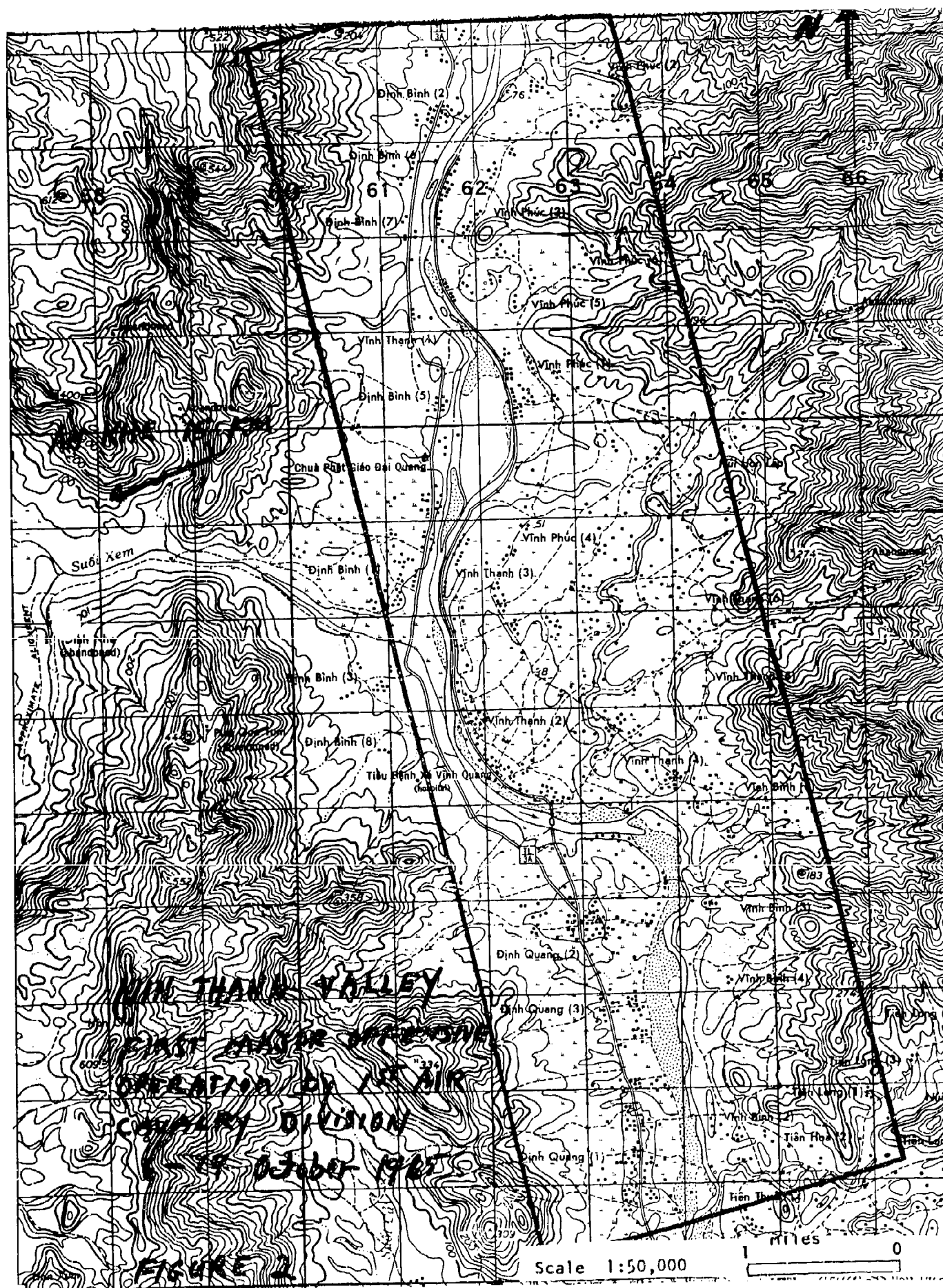
²⁴ Interview, General William C. Westmoreland, Grandfather Mountain Golf and Country Club, Grandfather Mountain, NC, 21 September 1975.

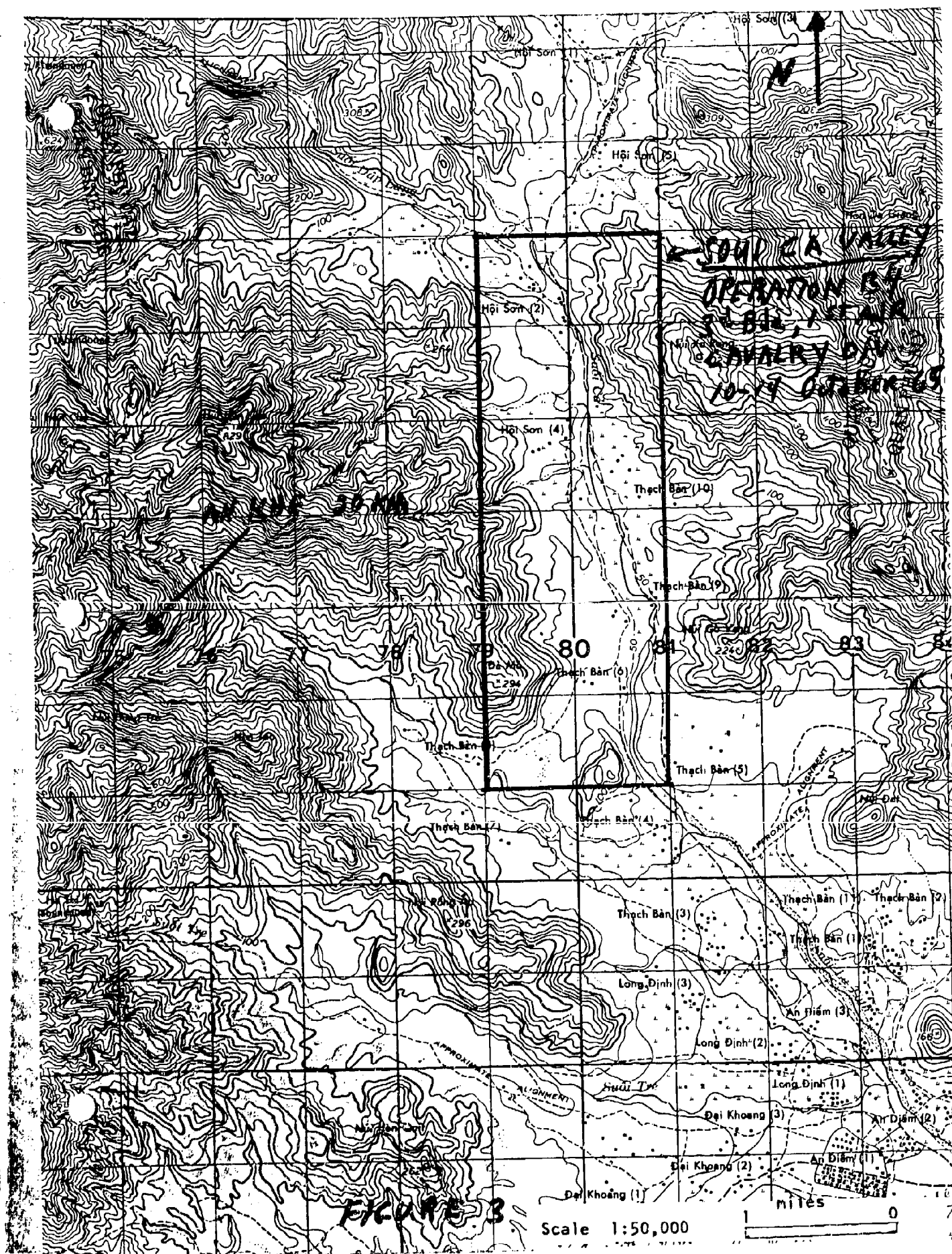
there was very little static defense by the 1st Cavalry Division except in protecting their own base camps and fire bases. The division was assigned a tactical area of responsibility (TAOR) on 28 September and conducted a two brigade-size offensive operation on 6 October to clear the Viet Cong from a heavily populated area in the Vinh Thanh Valley (Figure 2 and Figure 11) and another operation on 10 October when the 3rd Brigade launched a five-day operation in the Suci Ca Valley east of An Khe.²⁵ (Figure 3 and Figure 11). Other brigade size operations quickly followed and on 23 October 1965, General Westmoreland gave the 1st Cavalry Division permission to "...pursue, seek-out and destroy the enemy."²⁶ This order made the 1st Cavalry's mission clearly offensive.

In this same period, the division discovered both the need for armor and the feasibility of its use when a South Vietnamese armor column assisted the American forces in breaking through a North Vietnamese ambush to relieve a besieged Special Forces camp at Plei Me, just 35 miles south of Pleiku. (Figure 4 and Figure 11). Plei Me was under attack by a major North Vietnamese Army (NVA) force

²⁵Coleman, J. D., Major, Editor-in-Chief, The 1st Air Cavalry Division, Vietnam, Dia Nippon Printing Co., Tokyo, Japan, 1970, p. 27.

²⁶Ibid., p. 28.







which prevented the helicopter-borne American units from landing in the camp. Additionally, another NVA unit was waiting to ambush any relief column moving by land.

The ARVN armor column, supported by American artillery, was able to break through the Viet Cong ambush quicker than would have been possible by dismounted infantry. When the armor column reached Plei Me they entered the camp and took up positions to reinforce the defenses even though the camp was still under attack by the NVA.

Having failed to destroy the camp defenses and the ARVN armor column, the NVA withdrew to the west.²⁷

If the insurgent threat in Vietnam was only the Viet Cong and not North Vietnamese regulars it should have been noted that this same force was cadred and supplied by those responsible for the defeat of the French and therefore was a threat of sufficient magnitude to warrant the full resources of any American unit.

Thus, it still appears that an incorrect assessment of the terrain in Vietnam and armor capability to be employed in that terrain was responsible for armor not being deployed with the first American units. This

²⁷Coleman, J. D., Maj., Editor-in-Chief, The 1st Air Cavalry Division, Vietnam, Da Nippon Printing Co., Tokyo, Japan, 1970, p. 27.

contention is supported by a message from General Westmoreland to General Johnson on 5 July 1965 which states: "Except for a few coastal areas, mostly in I Corps area, Vietnam is no place for either tanks or mechanized infantry."²⁸

The first U.S. Armor units to be deployed to Vietnam were brought over with the 25th Infantry Division. These units, the 3rd Squadron, 4th Cavalry (3/4 Cav) and the 1st Battalion, 69th (1/69) were actually in Vietnam through a mix-up in orders. The 25th was supposed to leave its armor in Hawaii, but for some unknown reason, the units were included in the division move.²⁹

In March 1966, the 1/69 Armor became the first American armor battalion committed to combat in Vietnam.³⁰ The performance of the 1/69 in combat was highly successful and dispelled many of the myths concerning tanks in a tropical environment.

Having arrived in Vietnam in late February, 1966,

²⁸ Extract of message, Military Assistance Command, Vietnam, to Chief of Staff, Army, 051230 Jul 65, U.S. Army Chief of Military History Files, Washington, D.C.

²⁹ Interview, General William C. Westmoreland, Grandfather Mountain Golf and Country Club, Grandfather Mountain, NC, 21 September 1975.

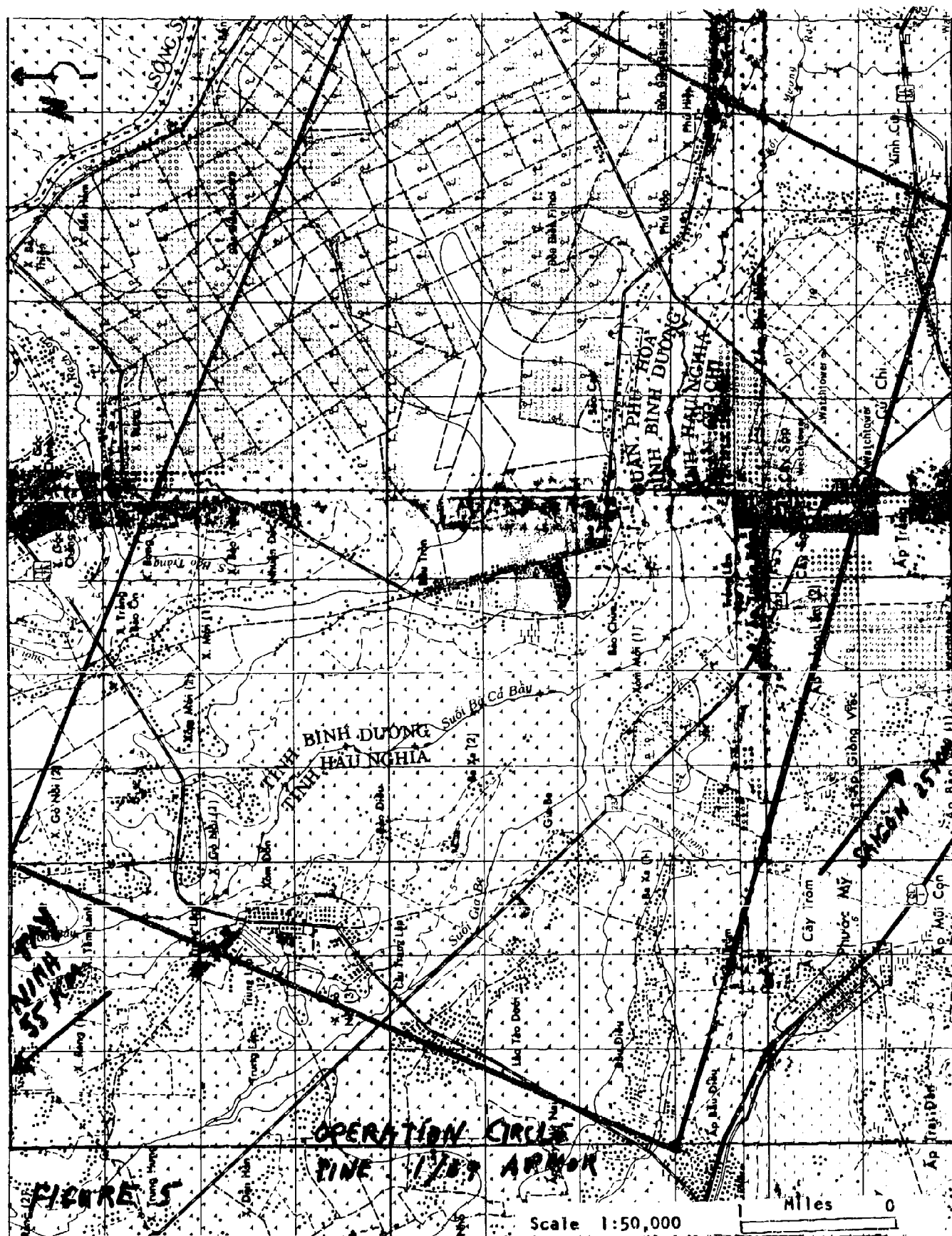
³⁰ Puchalski, R. Vincent, Specialist 5th Class, Tropic Lightning, 25th Infantry Division, Albert Love Enterprises, Inc., Doraville, CA, 1967, p. 338.

the battalion first engaged the Viet Cong during an operation code-named Operation Circle Pines, which took place between 29 March and 5 April 1966 in an area just north of the 25th Division base camp at Cu Chi (Figure 5). Circle Pines was a brigade-size operation which utilized a combined arms team for the first time in Vietnam. Other units in addition to the 1/69 Armor in the brigade were the 1st Battalion, 5th Infantry (Mechanized) (1/5); 1st Battalion, 27th Infantry (1/27th); elements of Company B, 65th Engineer Battalion, A Troop, 3rd Squadron, 4th Armored Cavalry, and supporting artillery units. Control headquarters for Circle Pines was 2d Brigade, 25th Infantry Division, commanded by Colonel L. M. Johnson, Jr.

Mission of the brigade was to conduct search and destroy operations in their assigned sector. This area had been completely controlled by the Viet Cong up to this time.

Each one of the infantry battalions were cross-reinforced with tanks from the 1/69 Armor and the 1/69 Armor had one company from the 1/5 Mechanized Infantry plus two squads of engineers from the 6th Engineer Battalion.

Results of this first armored operation are best stated by the Brigade Commander, Col. Johnson, in his



Operation Circle Pine 1/69 Armor

This operation was the Brigade's most successful to date in terms of Viet Cong killed and equipment and material captured or destroyed. It also marked the first employment in Vietnam of the 25th Division's armored battalion which very effectively combined with mechanized and regular infantry units plus a reconnaissance troop. The effective use of a combined arms task force will not only prevent friendly losses but will inflict maximum destruction on VC forces and fortification.³¹

Colonel Johnson also listed a number of lessons learned from this operation which further indicated the tank's success. Some of the more significant factors cited are:

Tanks and mechanized vehicles must be used continuously to beat the bush, explode booby traps, and engage snipers. Tanks moving through heavy brush will assist in uncovering tunnel entrances.

When snipers fire, the mobility and shock action of armor must be immediately employed in order to run them down or cut them off from withdrawing through trenches. Infantry should immediately follow the armor, utilizing the cleared area made by the tanks.

Snipers can be silenced during the night by using aggressive fire at irregular intervals. 90 mm cannon is highly effective in this role as well as a volley of artillery fire.

Mechanized or armored units can clear a helipad for a single helicopter³² in highly wooded areas in less than 15 minutes. This enhances the unit's flexibility in selecting an assembly area.³³

³¹Johnson, L. M., Jr., Colonel, Combat After Action Report, Headquarters, 2nd Brigade, 25th Infantry Division, 30 April 1966, p. 11.

³²The ability of armor units quickly to clear a helicopter pad is of great significance since wounded men were usually evacuated by helicopter and clearing a landing area by hand usually took hours.

³³Ibid., p. 12.

This first armored action also proved that tanks were not road bound in a tropical area but could maneuver cross-country in offensive action. Success of this first armor operation was brought to the attention of General Westmoreland and led to additional armor units being deployed to Vietnam.³⁴

The Need for Tanks--Limited Build-up

Although the armor strength in Vietnam increased significantly by the end of 1966, there was still a great imbalance in the ratio of infantry and armor. There were five full infantry divisions in Vietnam by this time but only two tank battalions, three divisional armored cavalry squadrons and one armored cavalry regiment. In addition to the five full divisions present there were three separate infantry brigades whose combined strength was nearly equal to another full division. Only four of these divisions had any mechanized battalion for a total of seven mechanized infantry battalions. The mechanized infantry battalion was a great asset to the infantry division since the M-113A1 armored personnel carrier used by the mechanized battalions provided excellent cross-country mobility, armor protection from small arms

³⁴ Interview, General William C. Westmoreland, Grandfather Mountain Golf and Country Club, Grandfather Mountain, NC, 21 September 1975.

fire and shell fragments, and reduced the requirement for frequent ammunition resupply since a great deal of extra ammunition could be stored in the carrier. Armored personnel carriers were not, however, a substitute for tanks in either firepower or armor protection and as the overall strength of the American forces continued to increase, the need for tanks became even more pressing.

Each mission in which tanks were used further proved the value of tanks in Southeast Asia in a variety of roles. There was no equal to the tank in the mission of convoy escort, road security, "jungle-busting," perimeter defense or in a variety of offensive operations. Details of the tank's missions and capabilities will be explained later in this paper, but at this point further examination must be made of the efforts to increase the number of armor units in Vietnam.

Major General Arthur L. West, Jr. (then Brigadier General) and General Michael Davison (then Major General) were on the Department of the Army staff in Washington when U.S. forces were committed to Vietnam. Both men tried continuously to convince General Harold K. Johnson, Chief of Staff of the Army at that time, of the need and feasibility of more armor in Vietnam. General Johnson resisted the efforts of these two armor generals until

one day, after much insistence by General West, General Johnson stated that he (West) did not understand the problem. The objective in Vietnam, Johnson stated, according to West, "...was not to win but to keep from losing."³⁵

Apparently Johnson was inferring that the tank was a decisive weapon and would add too much strength to the U.S. forces. It is not known whether Johnson's opinion influenced the total armor strength throughout the Vietnam war since he was not Chief-of-Staff for the entire period. General Westmoreland assumed the office of Chief-of-Staff on 3 July 1968, the same year in which the last armor unit was deployed to Vietnam.

Further insight into General Johnson's reasoning for his statement to West could not be gained since Johnson refused a request by this writer for an interview. However, a message from Johnson to Westmoreland dated 3 July 1965, lists a number of reasons why he (Johnson) ruled against sending tank battalions to Vietnam in spite of his staff's advice to the contrary. Most of the reasons stated by Johnson are so totally out of touch with reality that it is difficult to believe there were not more valid reasons which were not stated.

In the first instance Johnson referred to the U.S.

³⁵ Interview, Major General Arthur L. West, Jr., (Ret.), Auburn Hill Farm, Bowling Green, VA, 19 September 1975.

experience in Korea in which he stated that primarily because of the Chinese wooden box mine the tank units had limited usefulness. A student of military history could only gasp at the total inaccuracy of this statement. It is incomprehensible that a full general, Chief-of-Staff of the Army, could be so unaware of the history of the Korean War where the North Korean Army, using Russian-made T-34 tanks, pushed the American and South Korean Army the full length of the Korean peninsula and almost into the sea because these troops had no defense against tanks. Surely Johnson was aware of General Dean's urgent message to General MacArthur asking for American tanks. How could he not know that the American tanks were the weapon that stopped the North Korean armor and was instrumental in the breakout of the Pusan Perimeter. Even if through some odd quirk Johnson was not aware of all of this, his statement implying that the tanks should not be used because of wooden box mines is analogous to saying a rifle bullet can kill an infantryman therefore the infantry can not be used.

Johnson goes on to say that the tanks would slow the movement of the infantry. This reason has no validity since the M48A3 tank can move at 34 miles per hour and the average foot soldier moves at three miles per hour. In the jungle the tank can break through in minutes where the infantry may take hours or days. True, if tanks and

infantry were operating across rice paddies and the tank became bogged down the infantry would, or at least should, secure it until it has been freed, but this can be avoided by proper tank employment.

Johnson states further that the tank will create a psychological atmosphere of conventional combat and recall the French experience of 1953 and 1954. It is not clear why creating an impression of conventional combat is undesirable, but his reference to the French shows a complete lack of understanding of the French armor experience in Vietnam. As stated earlier, the French armor units were successful even with antiquated World War II equipment.

Johnson ends his message on a contradictory note with a statement that armored cavalry squadrons being sent to Vietnam will have tanks and if they prove desirable he will promptly ship a tank battalion if circumstances warrant.³⁶ A lack of sound reasoning in this message indicates that either Johnson did not dictate the message or it was a smoke screen for the real reasons he did not want tanks in Vietnam.

In spite of General Johnson's objection to sending tanks to Vietnam, the growing realization on the

³⁶ Extract of message, Chief of Staff, Army, to Military Assistance Command, Vietnam, 032131Z, Jul 65, U.S. Army Chief of Military History Files, Washington, D.C.

part of General Westmoreland and his staff that a mistake had been made in not deploying armor earlier resulted in the request for additional tank battalions and armored cavalry squadrons.³⁷

Westmoreland admitted his mistake in his book, A Soldier Reports. He states:

The ability of mechanized cavalry to operate effectively in the Vietnamese countryside convinced me that I was mistaken in a belief that modern armor had only a limited role in the fighting in Vietnam.... While their use among rice paddies and mountainous jungle would be limited, their firepower and psychological impact elsewhere would be reason enough to employ them. (tanks)³⁸

Another tank battalion, and the last to be deployed to Vietnam, was the 1st BN, 77th Armor, which arrived in Vietnam in July 1968, as part of the 1st Brigade, 5th Infantry Division (Mechanized). Armor strength in Vietnam reached its peak at this time with a total of three tank battalions, six armored cavalry squadrons and one armored cavalry regiment. This small armored force was woefully inadequate to cope with supporting eighty-one infantry battalions.³⁹ An understanding of the degree of imbalance

³⁷Interview, Lieutenant General Donn A. Starry, Commander, U.S. Army Armor Center, Fort Knox, KY, 28 January 1976.

³⁸Westmoreland, William C., A Soldier Reports, Doubleday and Company, New York, 1976, p. 178.

³⁹Army Buildup Progress Report, Department of the Army, Washington, D.C., 28 August 1968, pp. 7, 9-10.

between armor and infantry in Vietnam can best be illustrated by an examination of the Army's Table of Organization and Equipment (TO&E) and the ratio of armor to infantry in past wars.

Many different organizations were used by the infant tank corps in World War I so each battle would have to be examined for a completely accurate picture. In general, however, there was a high tank-to-infantry ratio used in the attacks where tanks were used to spearhead an attack of six infantry divisions. Approximately 350 tanks, constituting nine battalions, participated in the initial assault with the remainder in reserve.⁴⁰ Thus, each infantry division had nearly 80 tanks in support. It must be remembered, however, that the tank at that time was an infantry support weapon with the mission of destroying barbed wire to clear a path for the infantry and to silence enemy machine guns.

After World War I the mission of the tanks was still to support the infantry but were to be employed in a ratio of one light tank battalion for each infantry regiment.⁴¹

⁴⁰ Fitzsimons, Bernard, (ed.), Tanks and Weapons of World War I, BCP Publishing Ltd., London, 1973, pp. 114-115.

⁴¹ Ogorkiewicz, Richard M., Armour, Atlantic Books, Steven and Sons, Ltd., 1960, p. 14.

World War II saw the role of the tank expanded to almost every type of offensive action. This was made possible by the advancement in tank technology and by more liberal thinking on the part of American commanders after other countries had demonstrated the superiority of the tank in a primary role.

Organizational Considerations

Organizational structure within the Army has always been in the throes of change as the Army seeks to find better ways to accomplish its mission. By late 1943 the armored division was organized with three tank battalions, one armored reconnaissance squadron and three infantry battalions. With a ratio of one tank battalion for each infantry battalion the division commander could cross-reinforce to have three tank-heavy task forces and three infantry-heavy task forces. Total division tank strength was 159 medium tanks and 77 light tanks.⁴²

Infantry divisions of the period were very different. They were organized with nine dismounted infantry battalions and armor support was provided by separate tank and/or tank destroyer battalions. It would be difficult to draw any conclusions concerning the tank-infantry

⁴²Table of Organization and Equipment Number 17, War Department, Washington, D.C., 15 September 1943, pp. 4-5.

ratio in this case since the number of tank battalions attached to any given infantry division would vary according to the division's mission and priority.

By the time war started in Korea the Army divisions had again reorganized. Since armored divisions were not committed in Korea only infantry divisions will be considered. U.S. infantry divisions in Korea had three organic regiments. Each regiment consists of three infantry battalions, a regimental tank company with twenty-two tanks, and various support companies. Additionally, the division had one reconnaissance company with light tanks and a tank battalion with three tank companies. This gave the infantry division the equivalent of two tank battalions to support nine infantry battalions. There were exceptions to this rule, however, since some of the infantry divisions in Korea had a number of UN battalions attached, it was possible for a division to have as many as twelve infantry battalions to support. When the division had only its nine organic battalions to support the tank-infantry ratio was very close to the present-day dismounted infantry division. This type of infantry division is nearly a thing of the past since most infantry divisions today are mechanized and have a much higher tank-infantry ratio than the dismounted divisions.

Current U.S. Army divisions are organized around a "division base" which, with few exceptions, are the same for most divisions whether they are armored, mechanized, or straight infantry. A "division base" consists of the division headquarters, division staff and various administrative, maintenance, supply and support units. (Figure 6). Primary difference in each of the divisions is in the number and type of combat maneuver battalions.⁴³

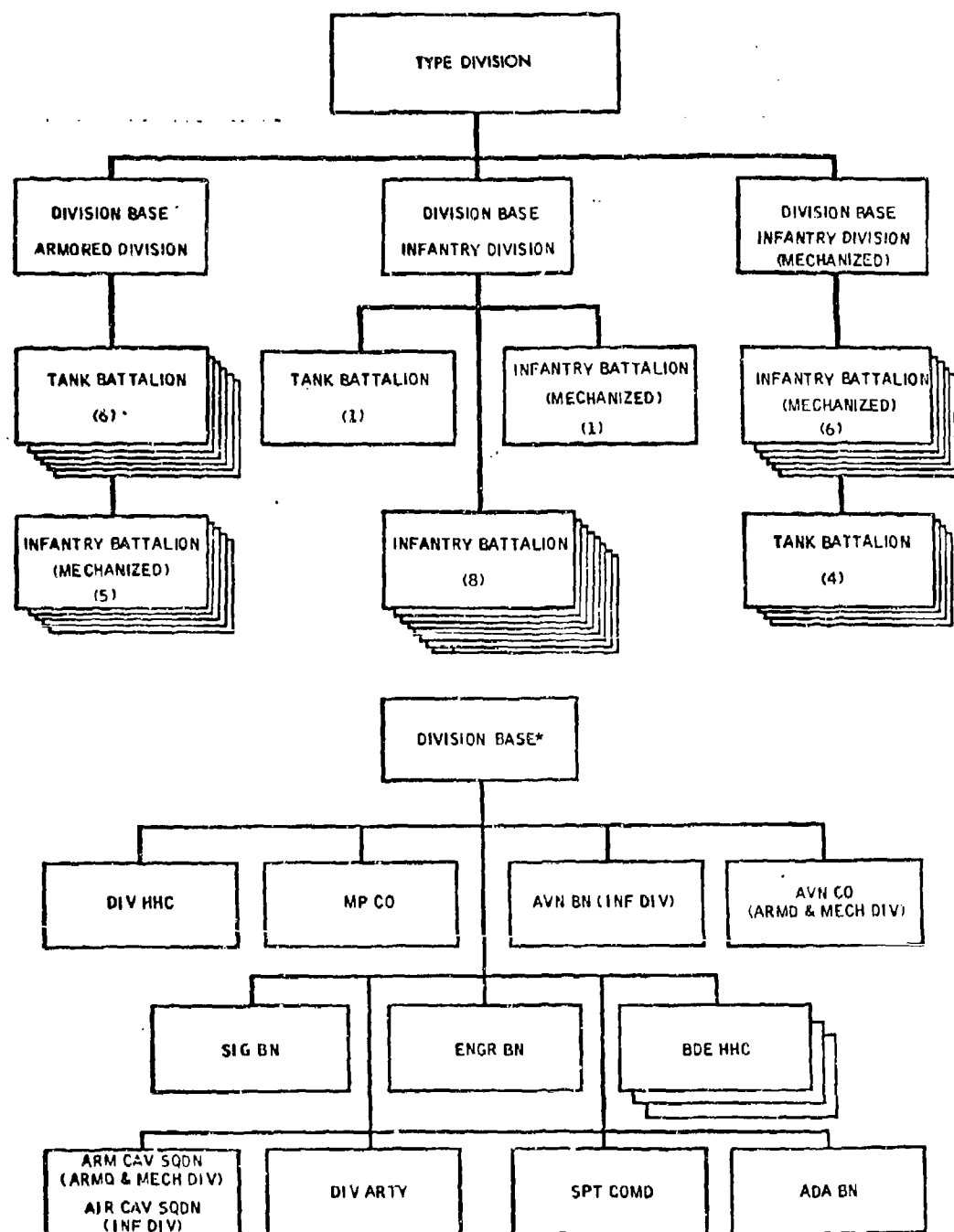
Usually, the armored division is organized with six tank battalions and five mechanized infantry battalions. A mechanized division has four tank battalions and six mechanized infantry battalions while an infantry division has only one tank battalion, one mechanized infantry battalion and eight infantry battalions. (Figure 7). Each of these divisions with the number of battalions just described is called a "type" division and may be assigned any number of battalions in a given situation.⁴⁴

For example, there are three armored divisions in the active army today. Of these three divisions two of them, the Third and Fourth Armored Divisions, are organized as a "type" division while the First Armored Division has

⁴³Only tank battalions and infantry battalions are classified as maneuver battalions.

⁴⁴Armor Reference Data, Vol. I, The Army Division, U.S. Army Armor School, Fort Knox, KY, January 1974, pp. 2-3.

THE DIVISION



*This diagram reflects division base units organic to armored, mechanized infantry, and infantry divisions only.

FIGURES 6 and 7

only four tank battalions and four mechanized infantry battalions. One infantry division, the 25th, is the only U.S. Army division today without a tank battalion.

Compared to the tank-infantry ratio of both the past and present, the U.S. forces in Vietnam were far below strength in armor. With a strength of seven full divisions and four separate brigades whose combined numbers more than equaled the combat strength of an eighth division, the tank-infantry ratio in Vietnam was two and one-third divisions for each tank battalion.

Problems Caused by Insufficient Armor

It is axiomatic that tanks are most effective when employed in mass.⁴⁵ Exactly at what point and in what numbers the reduction of mass degrades the tank's effectiveness would be difficult to say. Most tank unit commanders will agree however that it is undesirable to employ tanks in less than platoon strength. This is also army doctrine.

Army field manuals on armor operations state: "The platoon is the smallest armor unit to be attached to another organization."⁴⁶ "Tanks and infantry should

⁴⁵Special Text 17-12, History and Role of Armor, U.S. Army Armor School, Fort Knox, KY, April 1974, p. 57

⁴⁶FM 17-1, Armor Operations, Department of the Army, October 1966, p. 15.

not be attached in less than platoon strength. To do so is justified only when the entire platoon cannot be used effectively."⁴⁷ Guidance provided by field manuals is not, of course, absolute, but usually represents the best tactical method commensurate with conditions of terrain and the enemy situation.

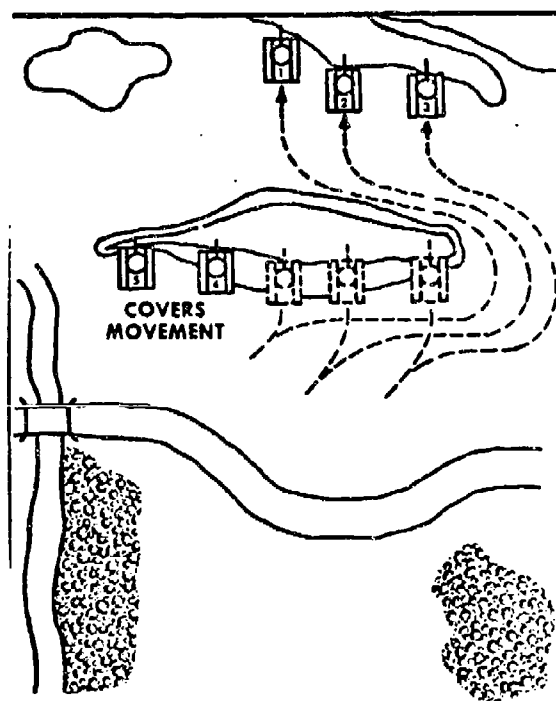
Armor has always been known for its flexibility to adapt to changing conditions and there are times, though rare, that it may be necessary to operate in less than platoon strength. It is not justified, however, by a lack of proper planning and force mix such as existed in Vietnam.

There are a number of reasons for the tank platoon to be employed as a unit, one of the foremost being the ability to provide mutual support between tanks. A tank platoon moving over unfamiliar terrain where the enemy situation is unknown will move in bounds. That is, one part of the platoon can stay back and support by fire while the rest of the platoon moves forward. Should the moving elements of the platoon be attacked, the overwatching elements will be free to maneuver against the attacker. With only part of a platoon, such as two tanks,

⁴⁷FM 17-15, Tank Units, Platoon, Company and Battalion, Department of the Army, March 1966, p. 27.

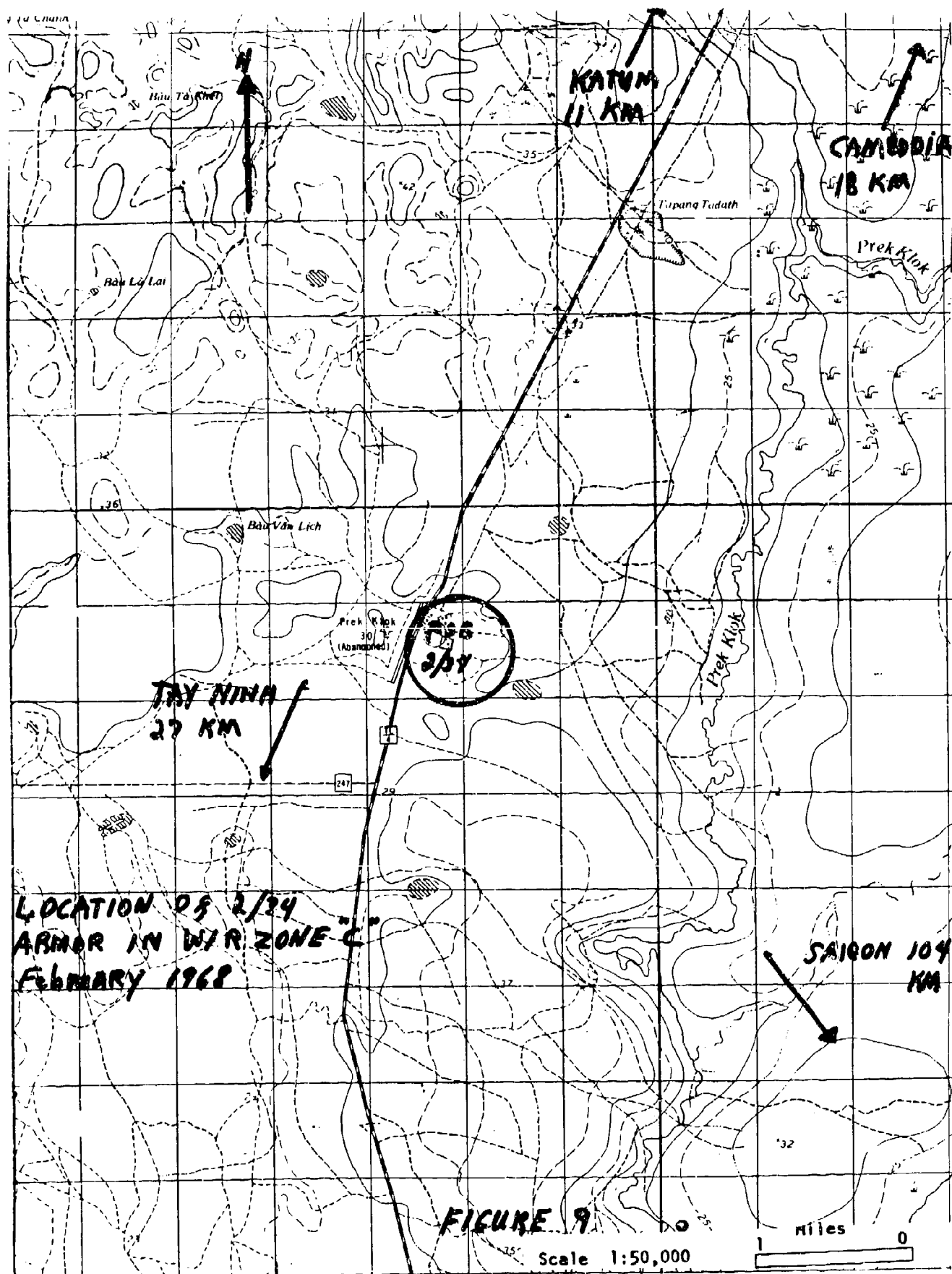
this would be impractical since the movement would separate the two tanks and leave them vulnerable to piecemeal destruction. (Figure 8).

Another reason for platoon size employment is for maintenance, supply and recovery support. Each tank company has an organic maintenance section with one tank retriever and a limited repair capability. When the platoons are detached from the company and attached in an infantry company, the tank company must still provide maintenance and recovery capability. One platoon centrally located can be accommodated, but if platoons are split with one or two tanks in a number of locations it becomes almost impossible to support these individual tanks. Additionally, if one tank becomes bogged down another tank can help extricate him, but other tanks must be available to protect both of these tanks during this critical period. Neither mechanized infantry companies nor dismounted infantry companies are equipped with a recovery vehicle capable of retrieving a tank, therefore the platoon must help itself or be assisted by the company or battalion maintenance section. Consequences of platoon piecemealing were highlighted by an incident which occurred in early 1968. Elements of the 25th Infantry Division were engaged in search and destroy operations in War Zone C (Figure 9 and 11) when the 2d Battalion, 34th



PLATOON MOVEMENT BY BOUNDS
TANKS 4 & 5 COVERING MOVEMENT

FIGURE 6



Armor (2/34 Armor), the division's only tank battalion, was ordered to send a platoon to an infantry battalion operating south of Tay Ninh. Upon arrival in the infantry battalion area, the platoon was split among the infantry companies with a single tank being attached to one company. While deployed in a marshy area, this tank became mired in the soft ground. Attempts by the tank to free itself only resulted in sinking deeper in the mud. Lacking a tank recovery capability, the infantry left a small security force with the tank and moved on. Darkness fell before a tank recovery vehicle (VTR) from 2/34 Armor could reach the tank, owing to the 50 plus kilometers the VTR had to cover. In their effort to protect the tank, the infantry had not deployed a sufficient distance to preclude anti-tank fire. A Viet Cong gunner hit the tank with an RPG round from the jungle and penetrated the turret detonating the tank's basic load of main gun ammunition. The tank was destroyed. Had the tank been with its platoon another tank could have freed it while the rest of the platoon secured the area.

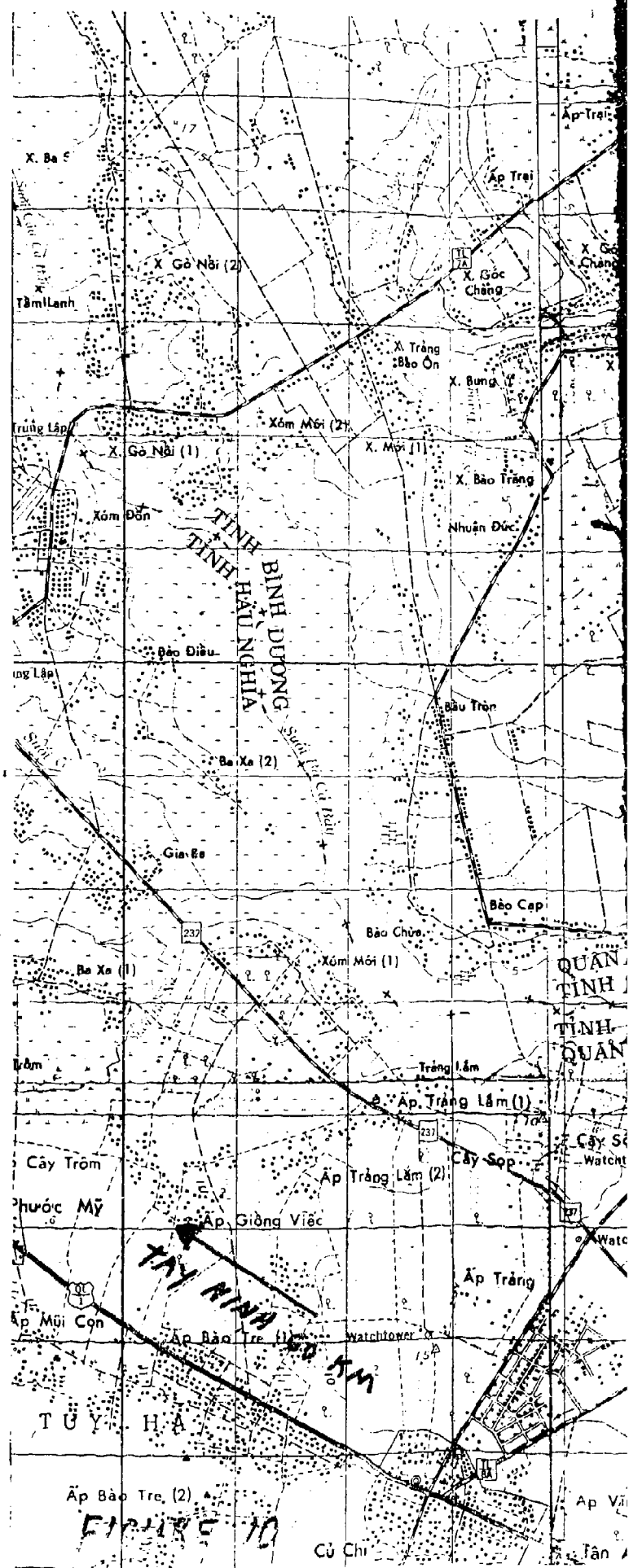
Supply is a less difficult problem, but nevertheless, a problem. Dismounted infantry units have very few vehicles and most of these vehicles use gasoline for fuel. Tanks burn large quantities of diesel fuel and must be resupplied by the tank battalion. Again, the

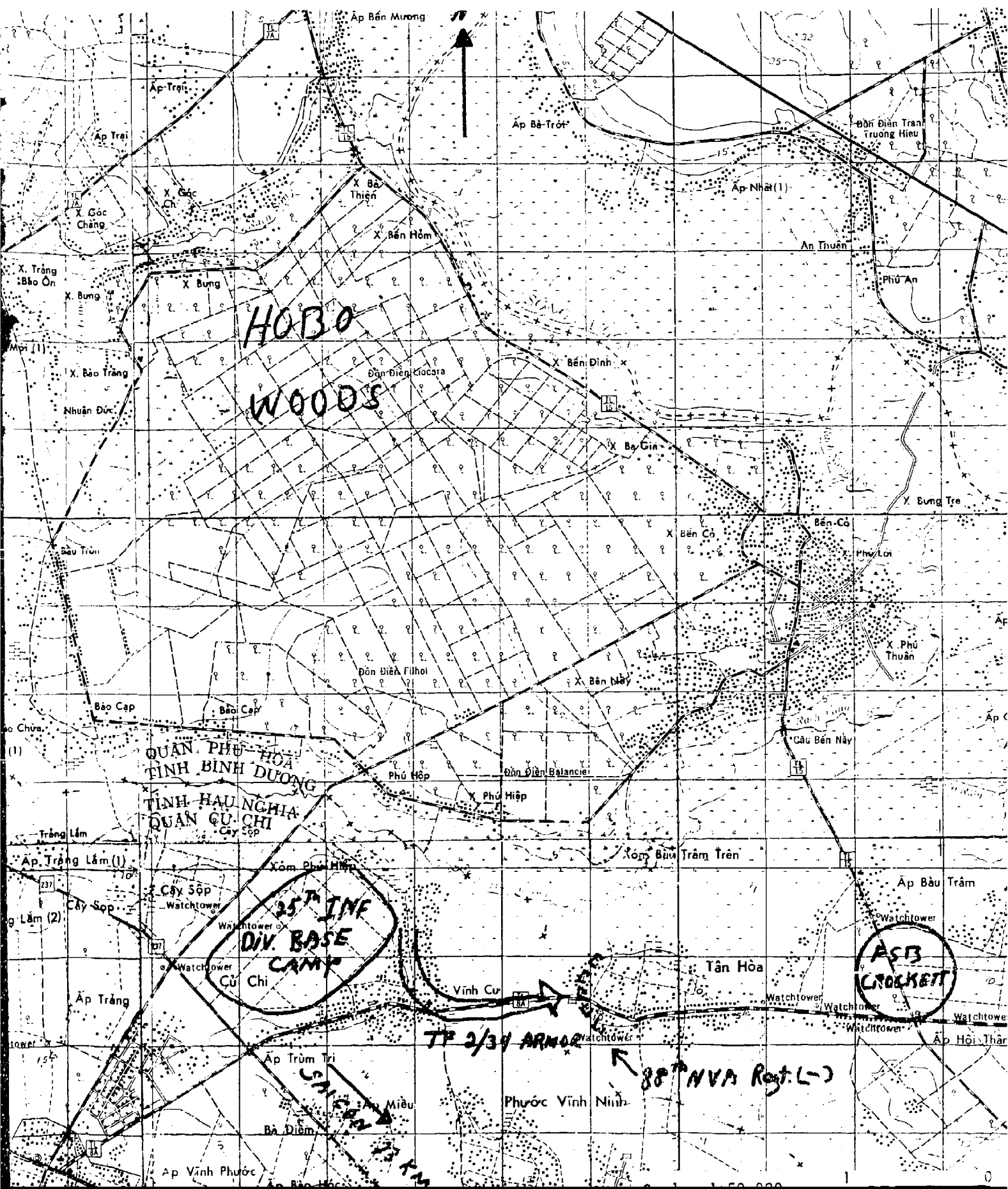
split platoon adds to an already difficult problem.

All of these problems are a consideration in the employment of the tank platoon but perhaps secondary to the reduced combat effectiveness of the platoon when it is split. The tank, in addition to its firepower, mobility and armor protection, has a great psychological effect on the enemy, known as shock action. It is unnerving and terrifying to the average dismounted soldier to see these thunderous weapons coming toward them, especially in large numbers. There is usually indecision on the part of the infantryman to know which tank to engage first. There is also a wave of panic that engulfs the soldier as to whether the tanks can be stopped at all. If only one or two tanks are in the attacking force, the psychological effect is reduced, the duration of panic shortened and the indecision less effective since all antitank weapons could concentrate on one or two tanks.

Finally, the tank platoon, when actually engaged in fighting, has the benefit of mutual support between the tanks. This differs from the movement by bounds mentioned earlier. When the tanks and dismounted infantry are advancing together, the tank must move at the speed of the infantry which is approximately three miles-per-hour. This makes the tank more vulnerable since a stationary or slow moving target is easier to hit than a

fast moving one. An enemy attack in this situation will often result in the infantry taking cover and leaving the tank unprotected from antitank teams. However, if an entire platoon of tanks is working together one tank can provide protection for the other. An excellent combat example of this type of situation occurred in Vietnam during the Tet Offensive in early 1968. One platoon of Company A, 2/34 Armor, commanded by Lieutenant John Hayes, was attached to the 2d Battalion, 27th Infantry, which was conducting search and destroy operations in the Hobo Woods. (Figures 10 and 11). During one phase of the operation Hayes' platoon was moving across an open area accompanied by an infantry company. This area was pock marked by huge bomb craters from B-52 bomber strikes with 2,000 pound bombs which restricted the tank platoon's ability to maneuver freely. As Hayes' platoon approached the woodline, the area erupted with antitank rocket fire. Most of the tanks sustained hits from the rockets and one of the tanks was set on fire. All of the infantry immediately withdrew leaving the tanks to fight alone. With three tanks still in action (one was lost the day before), Hayes was able to utilize suppressive fires from all of the tanks' weapons while maneuvering toward the burning tank to assist the crew in evacuation. Hayes then proceeded to deliver a high volume of fire as he





backed off from the Viet Cong ambush thus saving the tank crew and the other three tanks. Had the entire platoon not been together, it is probable that the crew from the disabled tank would not have survived the intense enemy fire.

Unfortunately, tanks in Vietnam were deployed in less than platoon strength with a frequency which made it the rule rather than the exception. When the tank battalion had control of a full tank company, the tanks were usually deployed by platoons. When the tank company was under direct control of a brigade or infantry battalion it was usually broken up into smaller elements to give each platoon or company at least token tank support.

Some of the mechanized infantry battalions were commanded by armor officers who fully understood the principles of armor employment and maintained platoon integrity where possible as did other mechanized infantry battalion commanders with armor or mechanized experience. Very few of the regular infantry battalion commanders had sufficient armor experience or training to understand fully the importance of keeping the platoon together and those that did seldom had enough tanks at any one time to allow them to deploy the platoon as a unit. The problem runs full-circle back to the basic lack of tank units in Vietnam.

None of the armor units in Vietnam were exempt

from this piecemeal employment. Lieutenant General (then Colonel) Donn A. Starry, former Commander of the 11th Armored Cavalry Regiment (ACR) in Vietnam, stated in his after-action report:

...There was an almost fatal fixation with the idea of breaking the cavalry down to the lowest level with ⁴⁸a few vehicles for each small infantry element
....

Since platoon integrity problems were due mostly to lack of sufficient armor in Vietnam it is to be expected that tank company and tank battalion problems were similar to the platoon. Battalion level problems were greatly magnified, however, in the areas of maintenance and support. In some instances the problems reached nightmarish proportions. One such instance occurred when Company C, 2/34 Armor, was detached from the battalion on 20 February 1968 and sent to the I Corp area (Figure 1) along with the 3d Squadron, 5th Armored Cavalry from the 9th Infantry Division. This move was prompted by a surprise attack on the Lang Vei Special Forces Camp by a North Vietnamese Army (NVA) unit using armor. (Figure 11). The loss of Company C reduced the 2/34 Armor to only one tank company, Company A. Company B had been detached from the battalion upon its arrival in Vietnam in September

⁴⁸Starry, Donn A., Colonel (now MG), 11th Armored Cavalry Regiment, Senior Officers Debriefing Report, 7 December 1969 - 7 June 1970, p. 15.

1966, and permanently attached to the 1st Infantry Division which had an armored cavalry squadron but no tank battalion. Three mechanized infantry companies were then attached to the 2/34 Armor for a mission in the area just north of Cu Chi. This was during the Tet Offensive and many Viet Cong and NVA units were active in that area. After a number of engagements with enemy forces the battalion received additional attachments in the form of an armored cavalry troop from the 11th ACR. In addition to supporting five line companies actually with the battalion headquarters, 2/34 Armor was still responsible for supporting its two detached companies, one of which was over three-hundred miles north. Support for Company B required only personnel replacements but, oddly enough, the battalion commander was also responsible for the conduct of the company and was required to render efficiency ratings on the company commander even though the company habitually worked for another division.

Resources allocated to a tank battalion for logistical and maintenance support are based on the organic strength of the battalion or an equivalent number. When additional units are attached to the battalion the battalion support capability is normally augmented by the parent battalion of the attached unit. For example, if a mechanized infantry company is attached to a tank

battalion the mechanized company is usually accompanied by a part of the mechanized battalion support platoon from the battalion headquarters company. By the same token the tank battalion provides support to the tank company when the tank company is attached to an infantry battalion. By mutual agreement the battalion commanders of the tank and infantry battalions may retain that portion of the support platoon normally allocated to the detached company which would still leave a balanced support system. In Vietnam however, the mechanized battalions in many instances did not send the proper support with their companies when they were attached to a tank battalion but still insisted on the tank battalion providing support to the detached tank companies. This overburdened the support capability of the tank battalion unnecessarily.

In the case just stated concerning 2/34 Armor, the battalion was strained to the limit to support its own companies and the attached units.

To further compound the situation, Company C at one time was split between four different divisions. None of these divisions had the capability to provide maintenance support for the company and due to a mix-up in the orders published by Headquarters, U.S. Army, Vietnam, (USARV), none of the divisions would provide personnel replacements. Parts were obtained in the

Saigon area by the Executive Officer of 2/34 Armor and airlifted to Phu Bai. (Figure 12). A most unsatisfactory arrangement. Again, this situation was caused by a lack of tank strength in Vietnam.

Supply and Maintenance Support

Since a lack of proper support was one of the major problems facing the armor units in Vietnam, some insight into the overall supply system is required to appreciate fully the situation.

From the time a unit is activated in the Army, the type and amount of equipment in that unit creates an increased demand on the supply system.

Spare parts are allocated and stocked in accordance with the quantities of various items of equipment. The initial allocation is determined by a mathematical formula. The amount is increased or decreased as experience dictates. Using the formula the Army authorizes stockage of repair parts starting at company and battalion level up through the division maintenance battalion through corps support command, theater level and finally, total Army stocks in the continental United States. At the using unit level, e.g., tank company and battalion, this parts stockage is called the Prescribed Load List, (PLL). At division level it is called an Authorized

LOCATIONS OF MAJOR TACTICAL AND
SUPPORT ELEMENTS OF U. S. AND FREE WORLD GROUND FORCES IN VIETNAM

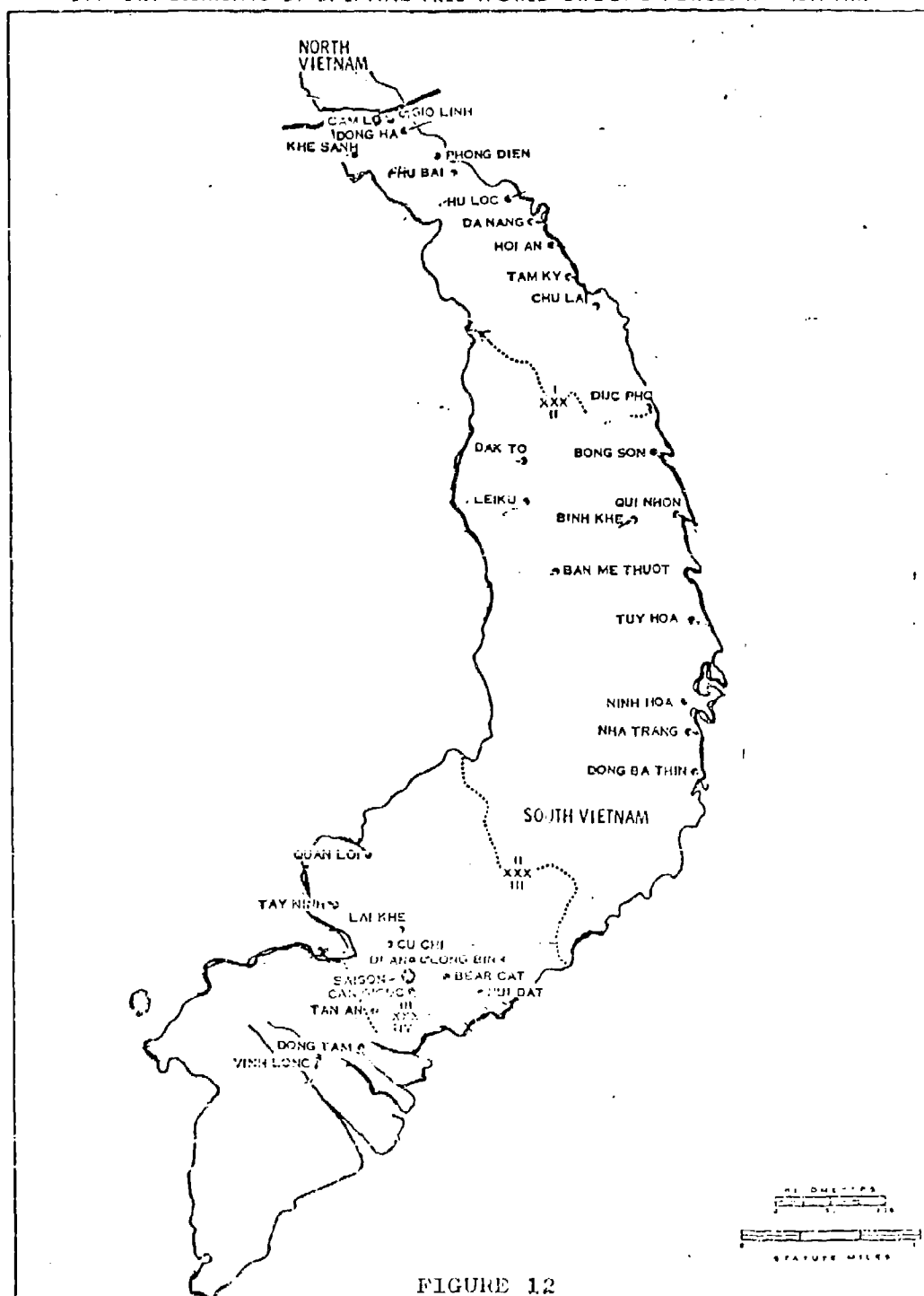


FIGURE 12

Stockage List (ASL). Any given unit is only authorized to stock the parts they are capable of replacing on an item of equipment. A tank company, for example, would be authorized to stock spark plugs for a 1/4 ton truck (jeep), since they are authorized to replace these spark plugs. They are not authorized to stock an item such as a tank transmission since the skill level for replacing this part is found at the maintenance battalion of the division.

Some exceptions are made to this rule. A tank company or battalion may repair or install items carried at the maintenance battalion level when one of the mechanics from that unit supervises the work. The part is still provided by the maintenance battalion, however.

As would be expected, the higher the number of any piece of equipment the greater the number of repair parts authorized. Yet, one of the basic support problems for the armor units in Vietnam was that there simply were not enough of them to cause the supply system to maintain the desired level of stock.

It may be confusing to describe a supply system that allows an adequate number of parts for a tank battalion and then state that the presence of only three tank battalions, plus a number of armored cavalry units, would not generate a sufficient stock supply, but there were other factors which had a bearing on the problem.

Probably the greatest single factor which caused a problem in parts support was the confusion which existed in the logistical system at depot level. Ships would off-load at major ports such as Saigon and Cam Ranh and trucks would then move the parts to a depot. Often Vietnamese drivers were used who had no understanding or concern for the U.S. supply system. These drivers would often lose the packing list that accompanied a shipment of parts. Consequently, that shipment would not get logged into the inventory. Over a period of time this lack of control of parts and equipment grew to such proportion that the control center for these supplies had no idea what was on hand in the depot. When a using unit requisitioned an item it would often be told the item was not available when actually there were a number of them on hand in Vietnam. This caused a breakdown in the supply system. Personnel from using units would have to make a trip to the depot and look through row after row of supplies to find what they needed and then arrange for transportation to get the items to their unit.

Compounding this problem for the armor units was a lack of proper maintenance support by the division maintenance battalion. This battalion is organized and equipped to secure, stock and issue repair parts pertaining to the equipment in the division and to provide field

maintenance of all divisional material except signal and cryptographic.⁴⁹

Just as the efficiency and effectiveness of a combat unit varies with the commander and his staff, so does a support unit such as the maintenance battalion. Some maintenance battalions did an outstanding job supporting their division and some performed in a totally unsatisfactory manner. Those performing unsatisfactorily or marginally did so because of a lack of training of the battalion personnel or through the disinterest of the commanders. There were also nondivisional maintenance units providing support on an area basis which were ill-equipped for the job of supporting armor or mechanized units.

A major contributing factor to armor's support and maintenance problems was a lack of appreciation on the part of many senior commanders of the necessity for periodic maintenance on tanks and other armor equipment. Most infantry battalions were usually given combat missions of relatively short duration at the end of which they would return to their base camp for a stand-down of two or three days. Tank battalions however were seldom allowed to do this, particularly in the dry season.

⁴⁹ Armor Reference Data, U.S. Army Armor School, Fort Knox, KY, May 1967, p. 98.

In one case, 2/3⁴ Armor working for the 25th Infantry Division operated for nearly six months without returning to base camp. During this period the battalion's vehicles incurred a great deal of damage from enemy action, yet there was a lack of maintenance and spare parts. To a large extent, this situation was brought about by a lack of sufficient tank strength in Vietnam. With only one tank company remaining in 2/3⁴ Armor (the other two were detached) to support the division in both convoy security and infantry support, there was rarely a day when the tanks were not needed.

Nor were the tank battalions themselves blameless for some of their problems. Many of the crew members were untrained in maintenance and the Army's quick promotion practice of both commissioned and non-commissioned officers placed men with little or no maintenance experience in positions of responsibility which resulted in a "blind leading the blind" situation. In some cases, the breakdown in the parts system originated at battalion level by poor record keeping and the failure to order parts in a timely manner.

Insufficient tank density and a serious lack of control at depot level were still, however, the primary cause of the unresponsive parts supply system.

Considerations for an Armored Division

An armored division in Vietnam would have solved most of the problems of maintenance support, parts supply, and the shortage of armor. Members of an armored division maintenance battalion are psychologically geared to the support of large numbers of armored vehicles and weapons and this maintenance battalion is larger than the one supporting an infantry division. Obviously there would be strong command emphasis on armor maintenance support. Parts supply problems would be significantly reduced through the influence exerted by an interested division commander. If necessary, contact teams would be placed in the vicinity of the supply depots to expedite the flow of parts to the division. This system worked well for the 1st Infantry Division and was reflected in the excellent support provided Company B, 2/34 Armor, the tank company attached to that division. Excessive periods of equipment utilization without maintenance would be eliminated by the number of tanks and other armor weapons available to the armored division. This does not mean that additional tank strength would not be needed for the infantry. Each infantry division would need two tank battalions for support of their own troops since the armored division would be employed in its own Tactical Area of Responsibility and would not be sending its tank battalions to support

infantry divisions.

Expertise in all armor matters could have been provided to the theater by the armored division commander and his staff. This would have greatly facilitated the intelligent employment of armor units by infantry commanders and increased the level of armor maintenance proficiency in those infantry division maintenance battalions which were lacking.

Employment of an armored division could have been maximized by shifting the forces of that division from III and IV corps zones to I and II corps zones with the change of the dry season. (Figures 1 and 13). Movement would be made by sea. Where the situation demanded, a brigade of the division could have been deployed independently with its forward support company from the maintenance battalion. While waiting for an area to dry from the monsoons, the tank units could perform maintenance and road/convoy security missions. Once the ground was firm they could resume search and destroy operations.

An evaluation of armor operations in Vietnam was performed by a study group from the Department of the Army from 6 January to 28 March 1967. This group, headed by Major General Arthur L. West, Jr., and called the MACOV Study Group, made a determination of the trafficability by tanks and APC's in the various regions of Vietnam.

(Figure 14). Conclusions reached by the group were that, overall, tanks can move with their organic support in 61 percent of Vietnam during the dry season and 46 percent in the wet season with armored personnel carriers being able to move in 65 percent of Vietnam year-around. In III Corp zone, 92 percent of the area is trafficable to tanks and APC's in the dry season.⁵⁰ (For detail of each zone see Figures 15 through 22).

With so much of the terrain in Vietnam trafficable to tanks, there is very little doubt that an armored division could have been employed there. Even in areas where tanks and APC's could not go the armored division could have used their five mechanized infantry battalions in dismounted operations while using the tanks in any number of defensive operations.

Since the armored division is the most powerful organization in the U.S. ground forces, it would appear that the misjudgement that prevented its employment in Vietnam denied the U.S. forces there the use of a highly effective arsenal of weapons.

Armored Cavalry Regiments--Another Option

Armored cavalry regiments (ACR) are organized for

⁵⁰ Mechanized and Armor Combat Operations in Vietnam, (MACOV', Department of the Army, 28 March 1967, p. 48.

PERCENT GO — TRAFFICABILITY

CORPS	DRY		WET	
	TANKS	APC	TANKS	APC
I	44 %	44 %	36 %	44 %
II	55 %	55 %	54 %	55 %
III	92 %	93 %	73 %	93 %
IV	61 %	87 %	0 %	87 %

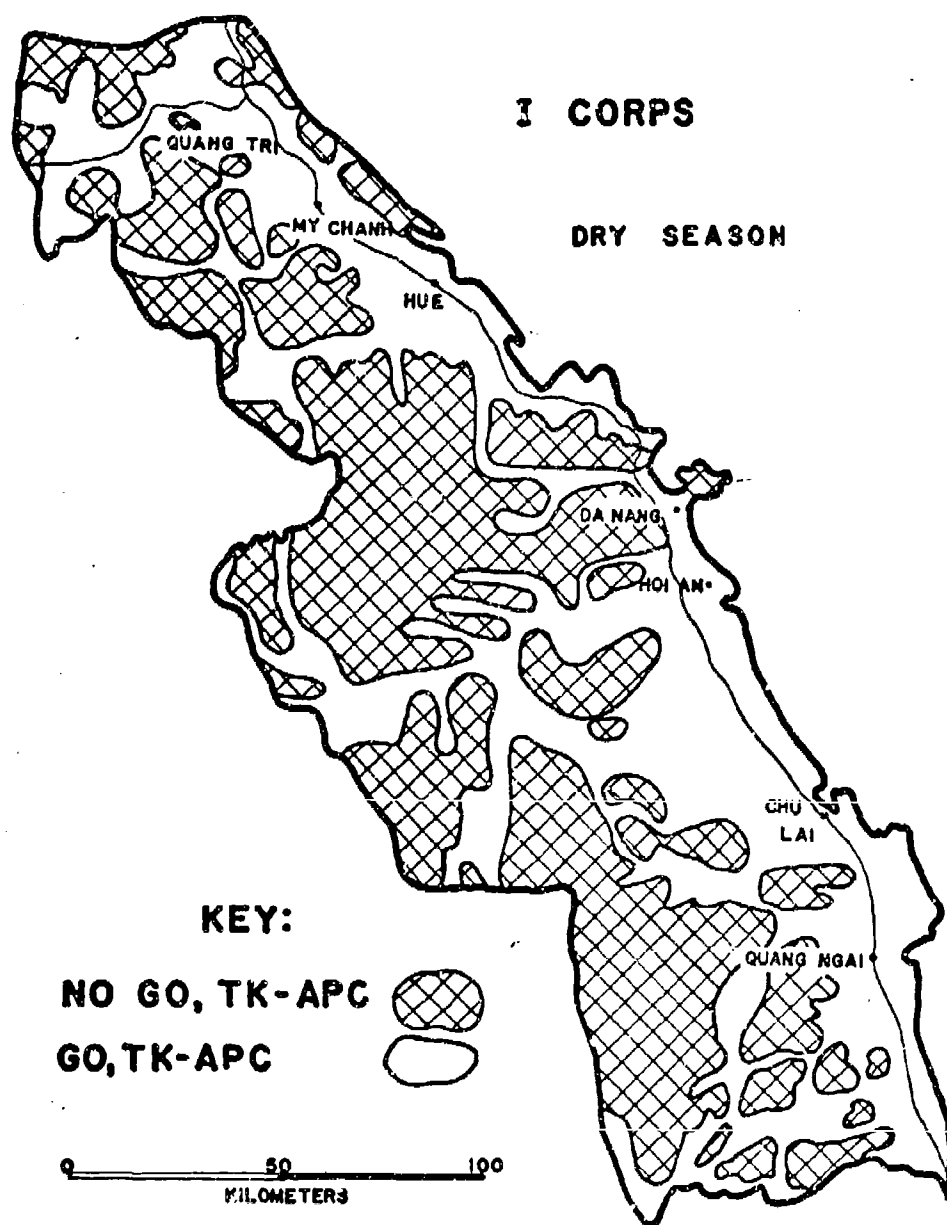
Summary of the Going by CTZ.

FIGURE 14

I CORPS

71

DRY SEASON



KEY:

NO GO, TK-APC

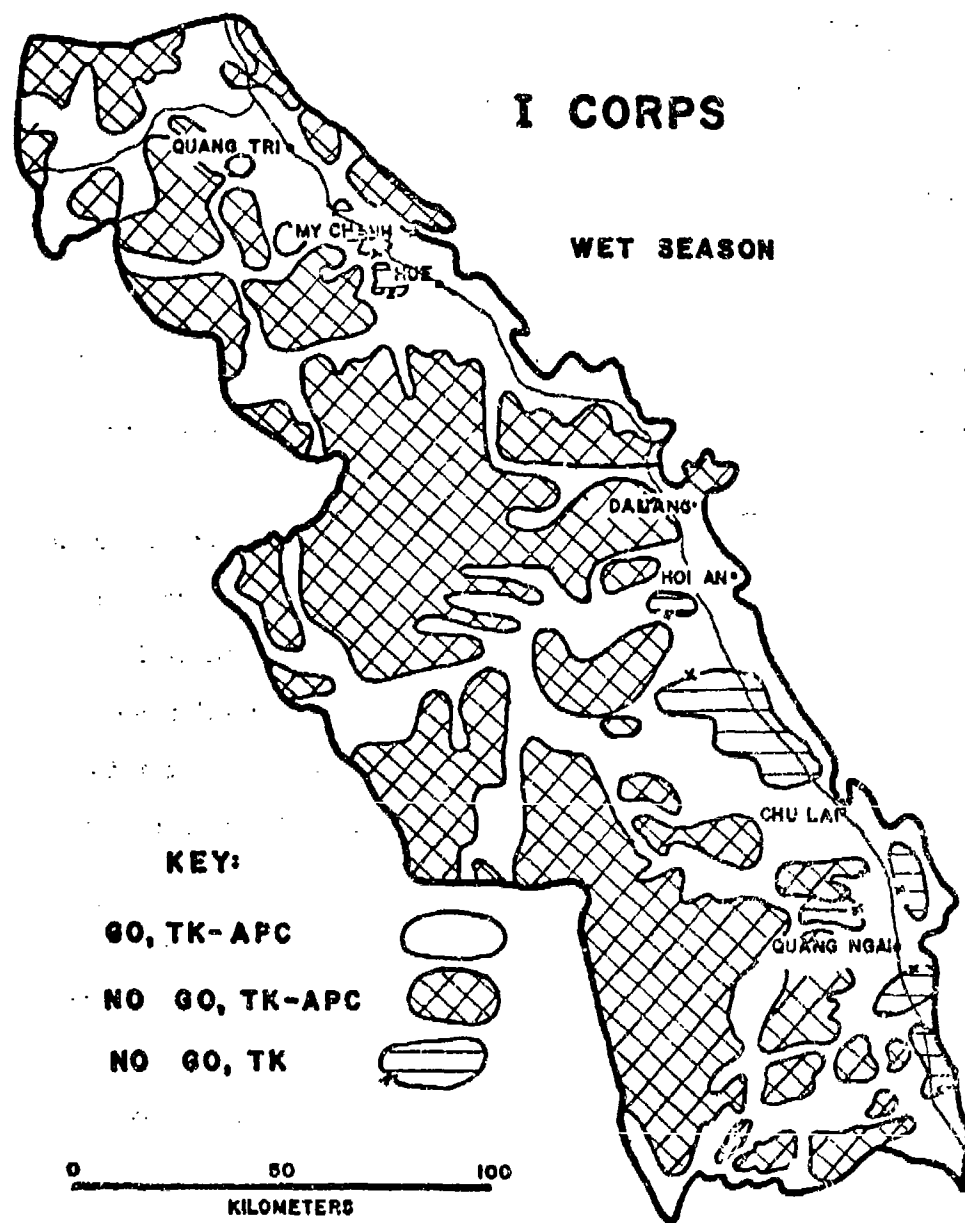
GO, TK-APC



0 50 100
KILOMETERS

Dry Season Going, I Corps

FIGURE 15

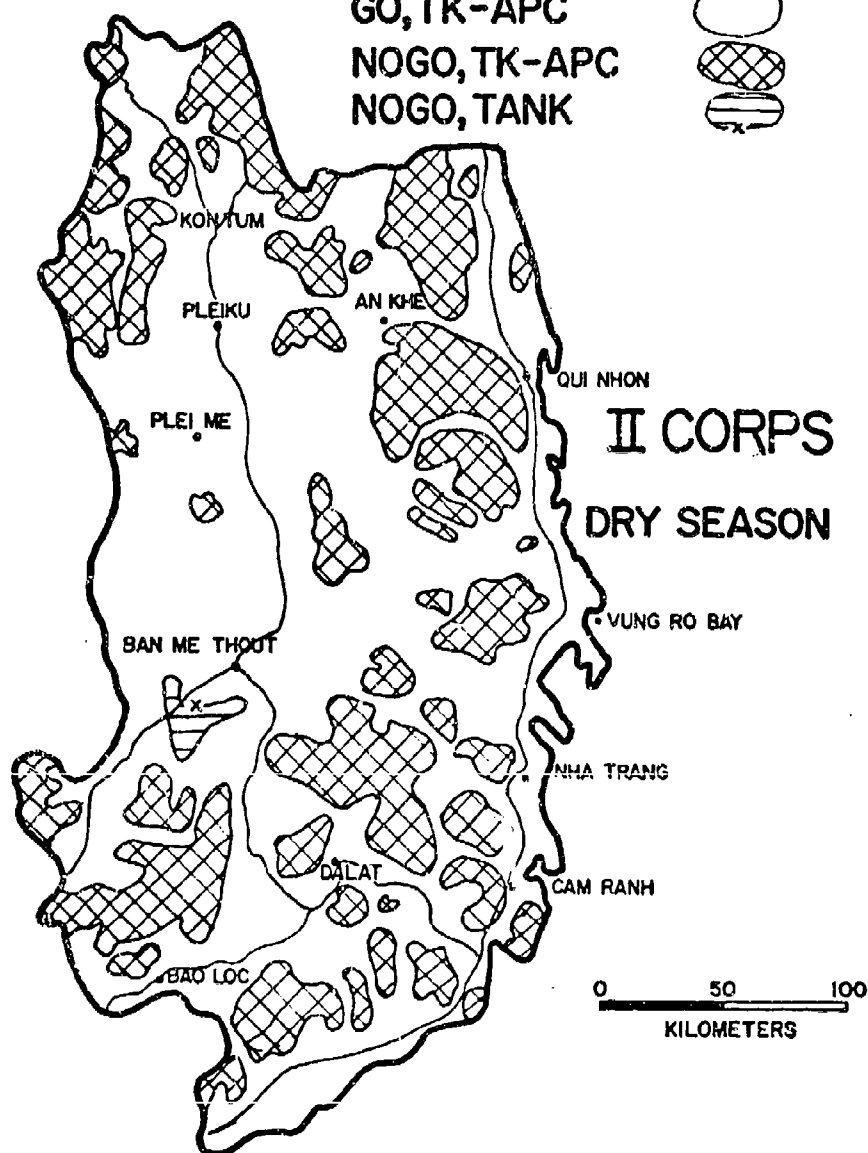


Wet Season Going, I Corps

FIGURE 16

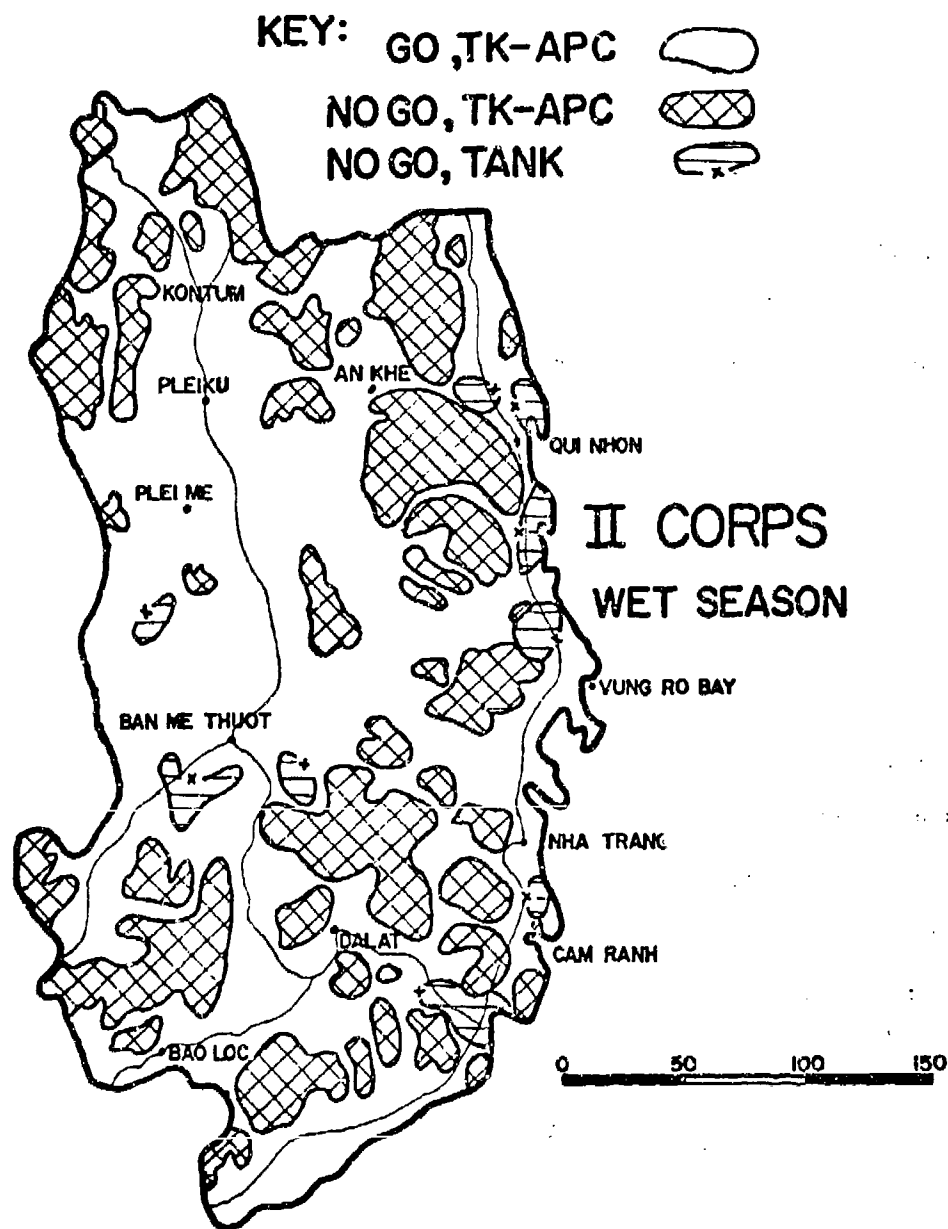
KEY:

GO, TK-APC
NOGO, TK-APC
NOGO, TANK



Dry Season Going, II Corps

FIGURE 17






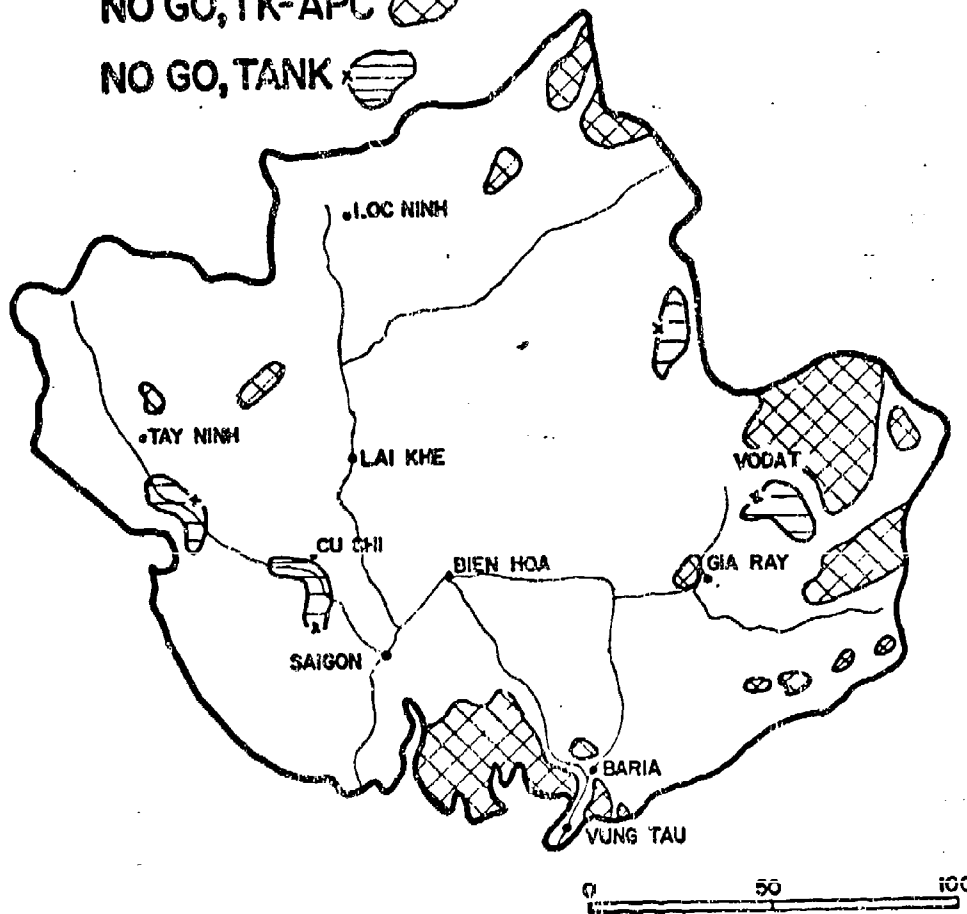
Wet Season Going, II Corps

FIGURE 1.

III CORPS DRY SEASON

KEY:

- GO, TK-APC 
- NO GO, TK-APC 
- NO GO, TANK 

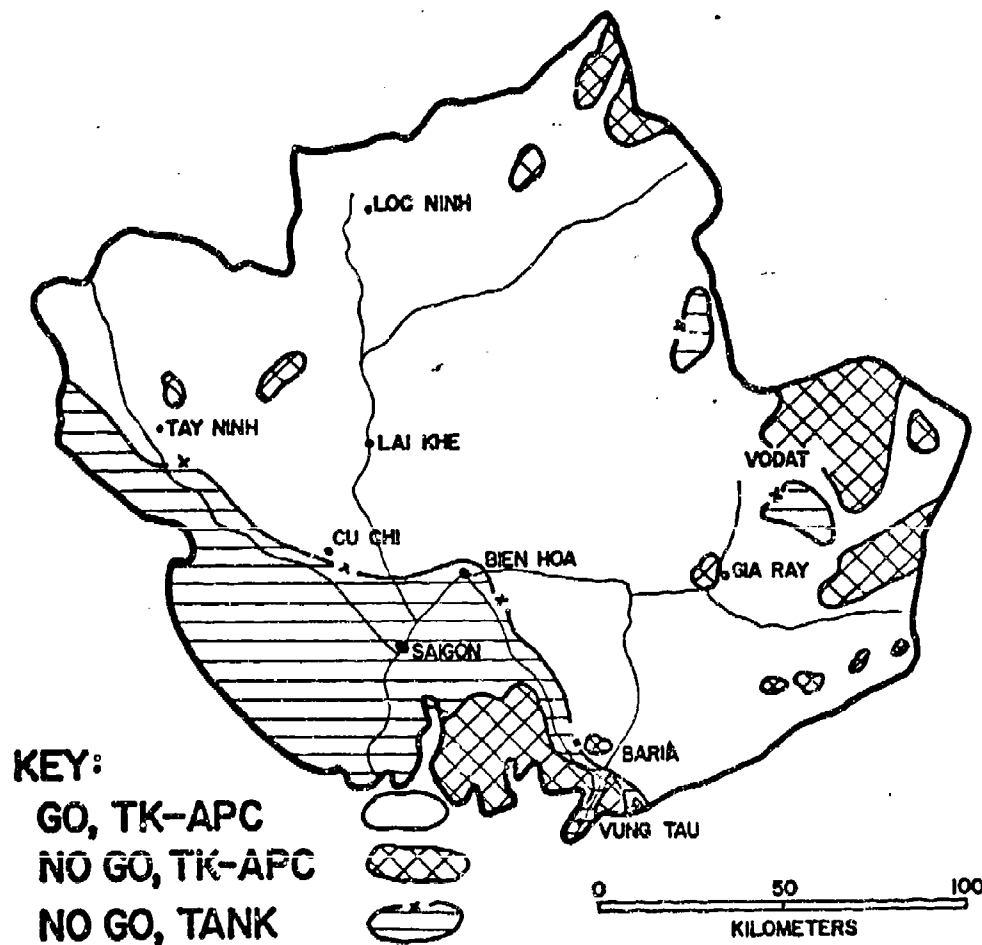


Dry Season Going, III Corps

FIGURE 19

III CORPS WET SEASON

76

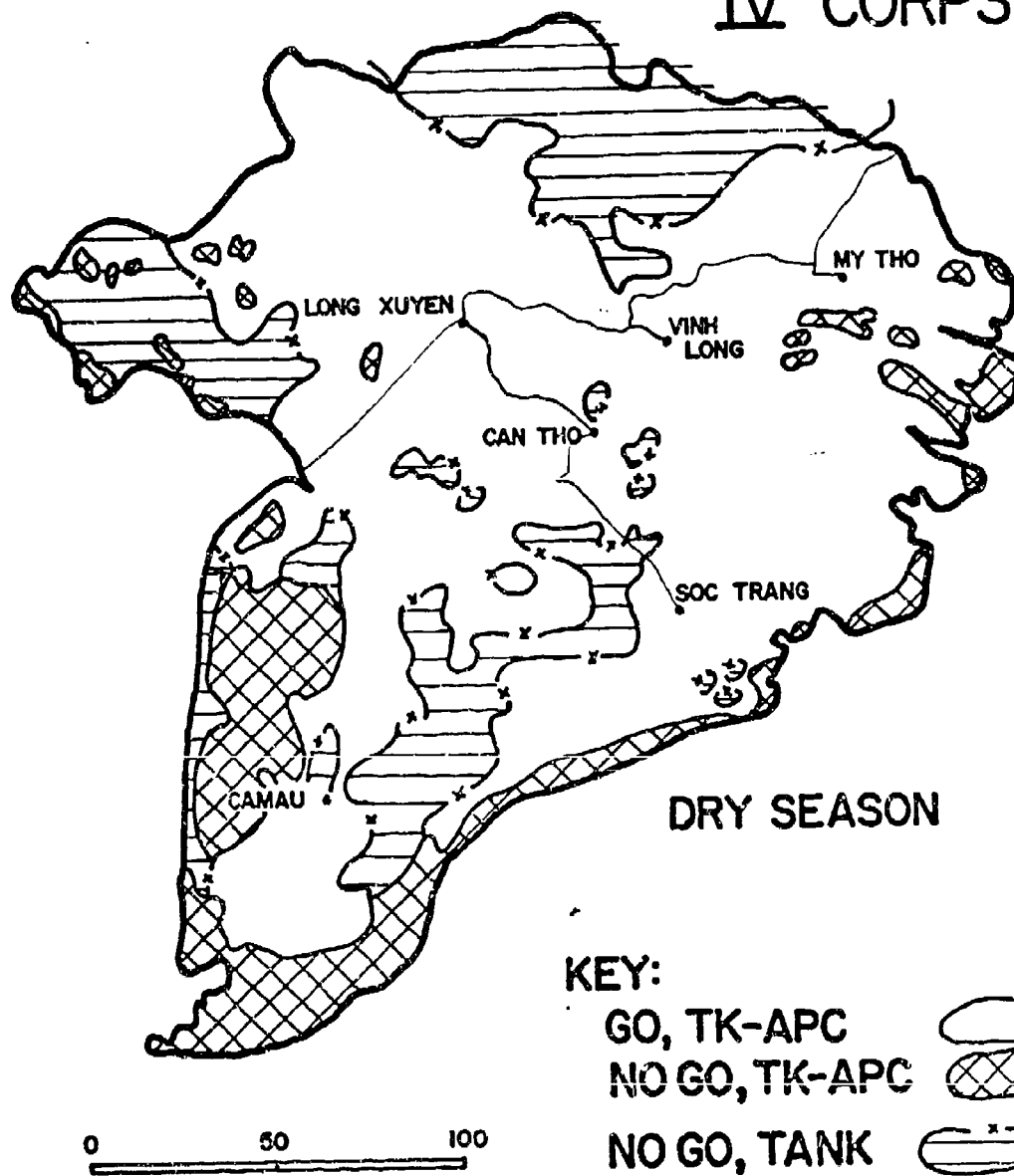


Wet Season Going, III Corps

FIGURE 20

IV CORPS

77

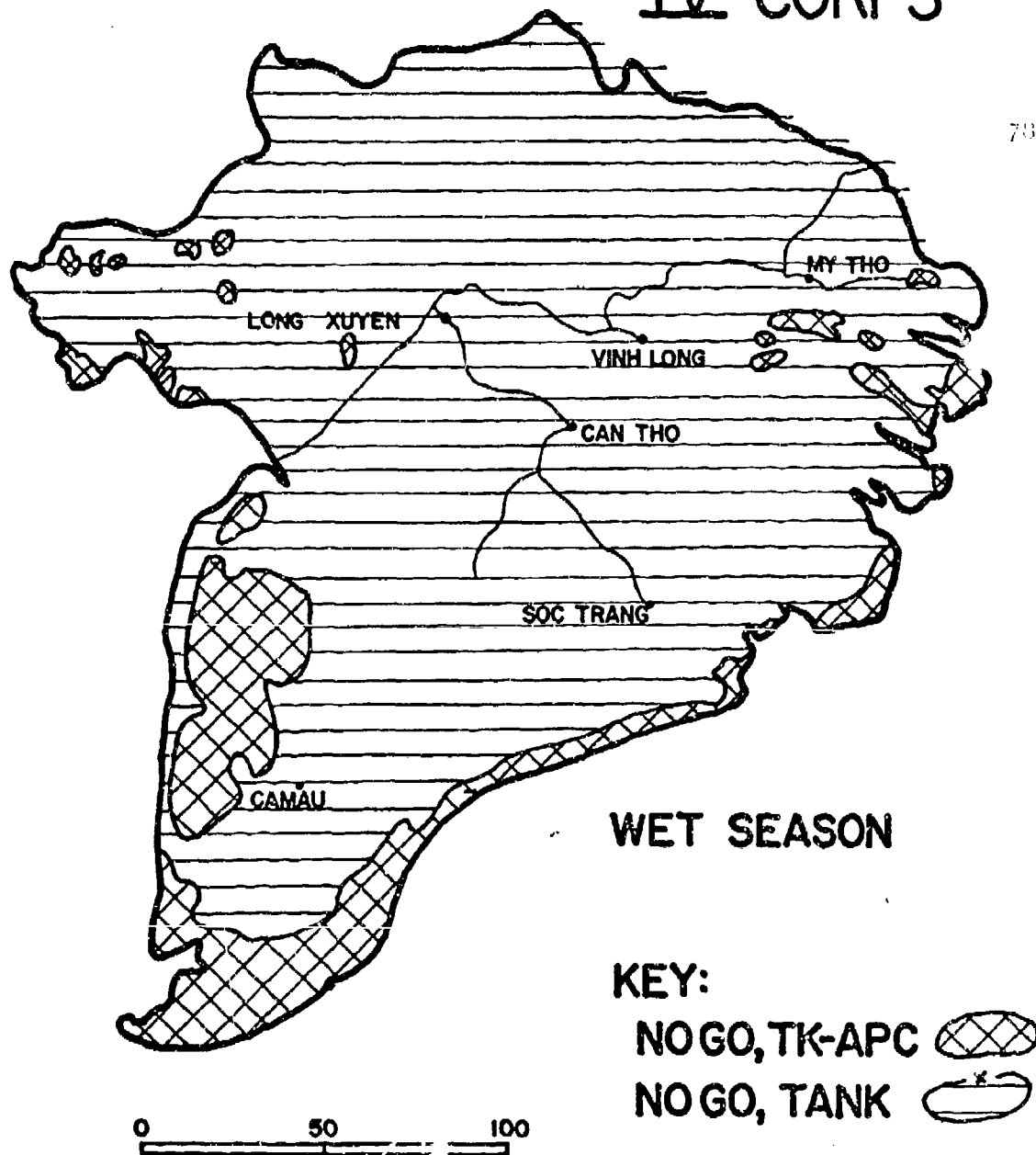


• Dry Season Going, IV Corps.

FIGURE 21

IV CORPS

78



Wet Season Going, IV Corps

FIGURE 22

independent operations. This type of unit is ideally suited for operations in a counter-insurgency environment. Only one ACR, the 11th, was deployed to Vietnam. Experiences of the 11th ACR vividly illustrated the effectiveness of this type of unit.

Employment of a number of ACR's to Vietnam would have been a viable, and perhaps more desirable, alternative to an armored division. In the opinion of General Starry, five ACR's could have completely sealed the Laotian and Cambodian border against VC/NVA infiltration into Vietnam and denied this vital sanctuary to the enemy. According to Starry, areas in which the 11th ACR operated were so tightly sealed that it brought the VC-NVA into the open in desperate attempts to be resupplied. Sealing of the Cambodian border in the War Zone C area cut the supply lines for enemy troops already in the area and over a period of time they were forced to seek other sources of supply. In doing so, they were usually detected by troopers of the 11th ACR and destroyed.⁵¹

Cambodia, as a Viet Cong sanctuary, was a thorn in the side of the U.S. forces in Vietnam. It was both frustrating and demoralizing to the Americans to know

⁵¹Starry interview, 12 December 1975.

that only an imaginary line provided a safe haven for enemy forces to rest, resupply and train anytime the pressure became great in Vietnam. Units operating in War Zone C could hear and see movement of enemy resupply vehicles across the border within artillery range but were not allowed to engage them. Yet they knew that sooner or later that same enemy, at a time and place of his own choosing, would soon be crossing that border into Vietnam.

When President Nixon authorized American forces to cross that border, one of the lead elements was the 11th Armored Cavalry Regiment which attacked through War Zone C into an area known as the "Fishhook." (Figure 23). During this operation, the 11th ACR killed hundreds of VC/NVA troops, destroyed hundreds of enemy bunkers and underground living complexes, and captured tons of food, weapons, ammunition and medical supplies.

This was a large operation involving not only the 11th ACR but the 25th Infantry Division, 1st Air Cavalry Division, and numerous other units including 2d Battalion, 34th Armor.

Flexibility and a high degree of combat capability are a result of the unique organization of the ACR. Seldom does this unit need additional combat units attached since the regiment is a large combined arms team consisting of tanks, artillery, infantry, air

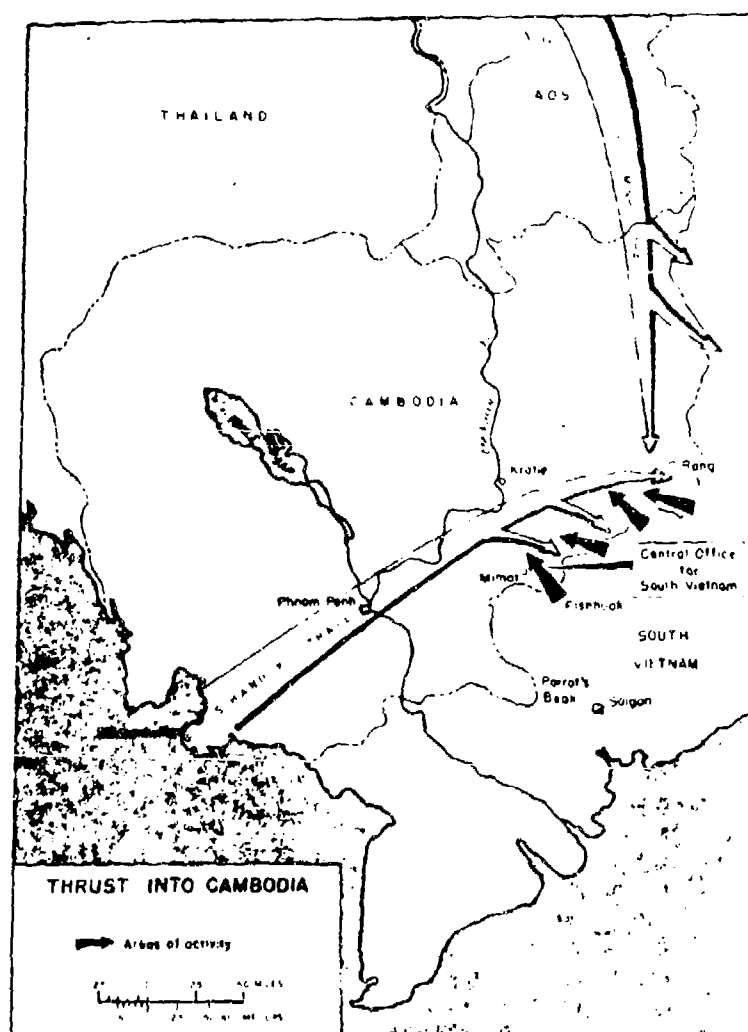


FIGURE 45

cavalry, track mounted scouts, and M-551 Sheridan "light tanks."⁵²

Augmentation of administrative and maintenance units normally is required for the armored cavalry regiment and in Vietnam additional infantry was needed since, for some reason, the rifle squads organic to the armored cavalry platoons were deleted from the units Table of Organization and Equipment (ACR). (For ACR complete organization see Figure 24).

Armored cavalry regiments can operate on a wide front and react quickly to enemy contact. Scout elements of the regiment are used to locate enemy forces, establish contact and notify regimental headquarters. With the resources at his disposal, the ACR commander could reinforce the scouts with sufficient fire power to defeat any size enemy element likely to be encountered.

Supporting fire was usually provided by the U.S. Air Force and long-range artillery but unlike other organizations, the ACR can also operate beyond the range of supporting artillery since each squadron of the regiment has a battery of 155 mm howitzers. Additionally,

⁵²The M-551 Sheridan's official designation is actually an Armored Reconnaissance Airborne Assault Vehicle (AR/AAV). In actuality, this vehicle is a light tank in all respects to include main armament, machine-guns, communication, armor protection and tracks.

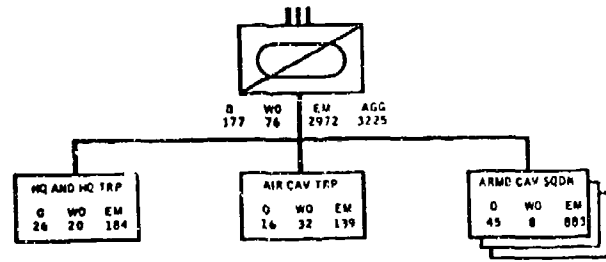
ARMORED CAVALRY REGIMENT

MISSION: To provide security and perform reconnaissance for the unit to which assigned or attached and to engage in offensive, defensive, or delaying action as an economy of force unit.

ASSIGNMENT: To field army and corps.

CAPABILITIES: a. Conduct reconnaissance operations.
b. Conduct security operations.

c. Operates in an economy of force role without being reinforced in offensive, defensive, or retrograde operations.
d. Operates as a task force when suitably reinforced in offensive, defensive, or retrograde operations.
e. Operates in support of forces engaged in stability operations.



Note: One Military Intelligence Detachment, TOE 30-14, will normally be attached to the regiment.

FIGURE 24

the organic air cavalry troop could provide rapid aerial support with rockets, machine guns and automatic grenade launchers.

Since the majority of supplies and reinforcements for the VC/NVA operation in South Vietnam were infiltrated through Laos and Cambodia, the sealing of these borders by sufficient ACR's would have left the enemy forces already operating in South Vietnam in dire straits and would have contributed to a speedy, successful conclusion to the American involvement there. Instead, another opportunity was lost to the air mobile infantry mania possessing the decision makers of the period.

Armor's Performance in Vietnam

Armor's effectiveness and desirability were proven early in the Vietnam conflict. Examples of 1/69 Armor stated earlier brought the tank's usefulness to the attention of the commander in Vietnam. As more armor arrived in country and missions expanded, the tank's worth was confirmed dramatically. Missions performed by armor units included search and destroy, clear and secure, and security operations.

Search and destroy missions were conducted to locate and destroy enemy forces along with their installations, supplies and equipment. The seizing and holding

of terrain was less important, for once the enemy was defeated in a certain area the armor unit normally moved to another area to begin a new mission. Tank battalions were habitually cross-reinforced with infantry while searching. There were a number of benefits to infantry to have the tanks lead. Tanks could destroy booby traps with their tracks and detonate antipersonnel mines with impunity. These vicious weapons injured and killed many infantry soldiers in Vietnam when they were working without tanks. When enemy contact was made with tanks in the lead, the initial effects were not as great on the friendly forces since the tank could take small arms fire without sustaining damage and the infantry could get behind the tanks to return fire or seek other cover.

If the operation was in dense jungle, the tanks were invaluable at breaking trails for the infantry. This not only saved a tremendous amount of time and energy for the infantry, but, as in the open, booby traps and mines were tripped by the tanks preventing infantry casualties.

Tanks often paid a heavy price in these operations, especially in the jungle. Visibility in the jungle was limited to only a few feet and the Viet Cong could stay concealed until the tanks were very close and then fire antitank rockets known as RPG's. The earlier model of this weapon, the RPG-2, was relatively ineffective

against the M48A3 tanks used by the Americans although some M48's were destroyed by this weapon. A later model, the RPG-7, was much more effective and could penetrate the tank's armor at almost any point. If the tank was penetrated there were varying degrees of effect depending on what the jet stream of the round hit when it entered the interior. Results could be insignificant, such as interior wiring or other equipment damaged, or a catastrophic secondary explosion that would kill the crew and destroy the tank. The latter occurred when the jet stream hit the basic load of the main gun ammunition.

As mentioned previously, the tank was also invaluable at quickly clearing an area for a helicopter to land and pick up a wounded man. There were two ways the tank accomplished this clearing task. One method was to fire cannister ammunition with the 90 mm main gun. This had the effect of a huge scythe cutting a large crescent through the trees and foliage. Another method was simply to drive around in increasingly larger circles crushing the vegetation and knocking down trees. In very dense jungle, a combination of both methods was used.

A serious problem facing American forces in search and destroy operations was the destruction of the enemy's bases of operations once they were discovered. A Viet Cong base camp was always underground in a network of

tunnels and heavily fortified bunkers. Destruction of an extensive underground complex often took a massive engineer effort, hundreds of pounds of explosives, a great many troops, and a lot of time. To leave the complex undestroyed meant certain reoccupation by more Viet Cong at a later date and often another assault on these positions by American troops. Tanks could do a great deal of damage to these tunnels and bunkers by driving over them and caving them in with their weight. Some bunkers were destroyed by the tank firing 90 mm high explosive ammunition into the bunkers and pivoting the tanks on top of them. Infantry operating without tanks had no choice but to leave the bunker complexes intact or do only minimal damage with the small amount of plastic explosives they carried.

Quantities of ammunition carried on a tank was another asset. Infantrymen have only the ammunition they can carry. Since they must also carry their food, water, and various other items, their basic load is comparatively small, usually 300 rounds of ammunition for their automatic rifle, a few fragmentation grenades. Some carry one or two M-72 Light Antitank (LAW) weapons. In an ambush or other intensive firefights the infantrymen totally exhaust their supply of ammunition in as little as fifteen minutes. Mechanized infantry is an exception

to this rule since they can carry large quantities of ammunition in their armored personnel carriers. However, since infantry normally fight dismounted, there are times when they cannot get to their carrier to be resupplied. The tank, on the other hand, may not expend all of its ammunition for as long as two or three hours. Additionally, when the infantry needs ammunition they are usually resupplied by helicopter. In many firefights, the helicopter cannot land in the vicinity of the fight without being hit and possibly destroyed by ground fire. By the same token the infantry cannot easily disengage from the enemy to walk a great distance to be resupplied. Tanks, however, can back away from the fight one at a time to resupply and quickly return to the fight.

Two examples come to mind at this point which illustrate the tank's staying power and ability effectively and efficiently to disengage to resupply. They also show how three tanks were used to destroy a Viet Cong ambush which had an entire infantry company pinned down out of ammunition.

The first incident occurred in April 1968 when two companies of the 2d Battalion, 27th Infantry, walked into an ambush in the Hobo Woods just north of Cu Chi. (Figures 10 and 11). Moving across an open rice paddy area toward a patch of woods the company was very near the woods when

the woodline suddenly erupted with small arms and automatic weapons fire. All of the men took cover behind the dikes in the rice paddies and returned fire. In a very short time most of the men were out of ammunition. Those still attempting to return the fire were wounded or killed as soon as they raised above the dikes to fire their weapons. Helicopters that tried to resupply the trapped company were immediately driven off by the intense enemy fire. Lieutenant John Hayes, a platoon leader from Company A, 2/34 Armor (mentioned earlier) was attached to this infantry battalion but had been left in the command post area.

Hayes was not sent forward to extricate the company with his three remaining tanks. (Hayes' loss of his other two tanks described earlier). Arriving at the scene of the fire fight, Hayes attacked the dug-in Viet Cong with his three tanks firing 90 mm canister, 7.62 mm machine guns and .50 caliber machine guns. Hayes' tanks were immediately taken under fire by a number of RPG gunners with hits being scored on all three tanks. Hayes continued to press the attack and soon the platoon sergeant's tank was disabled and burning from RPG fire. Shortly thereafter, Hayes was seriously wounded when an RPG gunner hiding in a hole hit Hayes' tank from the rear. With his tank burning, Hayes and his crew evacuated the vehicle but not before the three tanks had

routed the Viet Cong. Hayes' attack left 47 Viet Cong dead by actual body count and the pressure was removed from the embattled infantry companies. Both Hayes and his platoon sergeant were evacuated to the hospital at Cu Chi where they were decorated for bravery the next day by the division commander.

Another incident occurred in a small village just west of Cu Chi at about the same time. A fire support base (FSB) had been established approximately 10 kilometers east of Cu Chi. (Figure 10 and Figure 11). Conducting search and destroy operations at that time in northern War Zone C, 2/34 Armor, commanded by Lieutenant Colonel John Tipton, was ordered to move south to secure this fire support base dubbed FSB Crockett. Stopping only to resupply at Cu Chi base camp, 2/34 Armor proceeded east along Route 3A. As the battalion approached the small village of Tan Hoa (Figures 10 and 11) only one kilometer from the Cu Chi base camp, they were taken under fire by a large enemy force identified as the 88th NVA Regiment.

Three mechanized infantry companies were attached to 2/34 Armor at this time and they immediately deployed from the column formation on the road to a line formation for an assault. (Figures 25 and 25A). Troops dismounted from the armored personnel carriers and a heavy fire fight was soon in progress. Tanks deployed with

COLUMN FORMATION:

- (1) Provides good security and permits maximum fire to the flanks, but permits less fire to the front.
- (2) Facilitates control.
- (3) Facilitates rapid deployment into any other formation.
- (4) Is used in approach marches, night movements, fog, and when passing through defiles or dense woods.



**HAND AND ARM SIGNAL
COMMAND: (PLATOON) FORM COLUMN**

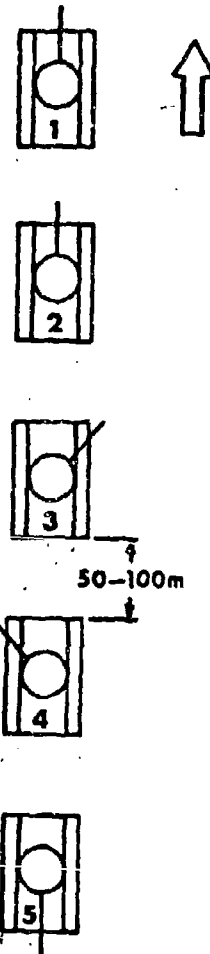


FIGURE 25

LINE FORMATION:

- (1) Permits maximum fire to the front or rear, minimum fire to the flanks.
- (2) Is more difficult to control than column.
- (3) Does not provide as much depth as column.
- (4) Is used by forces and units in supporting positions. It should be employed by tanks emerging from smoke, crossing crests, leaving woods, and assaulting an objective.
- (5) Permits closing on the objective in minimum time.



**HAND AND ARM SIGNAL
COMMAND: (PLATOON)
FORM LINE**

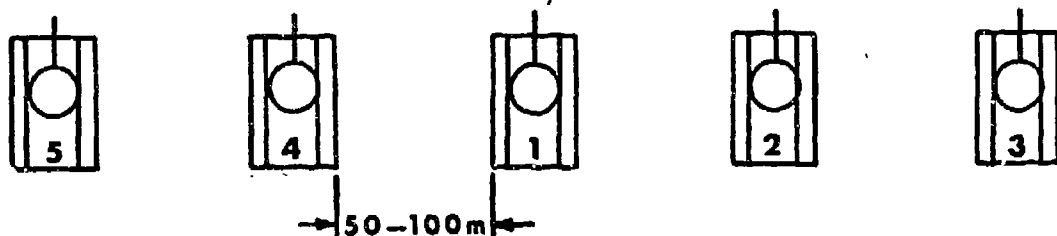


FIGURE 25A

the infantry and returned fire with all tank weapons. So intense was the firing that the tanks were expending their basic load of ammunition in less than an hour. When a tank ran out of ammunition it slowly backed away from the enemy, returned to the battalion trains area, quickly resupplied and returned to the fight. Each tank did this in turn even though they were engaging the enemy in many places as close as fifteen meters.

During this same fight an outstanding example of the tank's psychological effect occurred. Three tanks from the headquarters tank section were attached to one of the mechanized infantry companies. A new company commander had been assigned to this company only a few days before. From prolonged combat and a high casualty rate, the morale of this company was low. When one of the tanks expended his basic load and notified the infantry company commander by radio that he was pulling back to resupply, the company commander immediately called back and asked the tank commander not to move. When the tank commander reminded the infantry commander that he was totally out of ammunition and could not fire it was again requested that the tank not move.

This fight lasted for approximately six hours. During the briefing session that evening with Colonel

Tipton and his staff, the infantry commander expressed his gratitude for the tank staying in position even though it was out of ammunition and exposed to enemy fire. He stated that if the tank had moved back, his company would have broken and run. He felt they were just hanging on under the murderous fire from the NVA forces and the sight of the tank leaving would have caused panic in the company. An example of tank-infantry cooperation at its best.

Clear and secure missions conducted by tank units were essentially the same as search and destroy operations in that one of the main objectives was the destruction of enemy forces. Primary difference between these types of operations was that clear and secure missions aimed at a designated area with the objective of driving VC/NVA forces out and keeping them out. Operations continued in the same area until that area was considered secure. Emphasis was placed on seizing and holding key population and communication centers.

Any operation which aimed at totally eliminating Viet Cong presence could rarely, if ever, be considered a complete success. Only as long as U.S. forces remained in the area they cleared was there a significant degree of security from the Viet Cong forces. Once U.S. forces moved to another area, the Viet Cong were able to infiltrate the area again. There was always a great risk in

considering an area "secure." This point was brought home to the Americans and South Vietnamese Army forces during the Tet Offensive of 1968 when areas previously cleared and considered secure virtually erupted with VC/NVA units. Results of clear and secure operations, therefore, are for all practical purposes, no different from search and destroy.

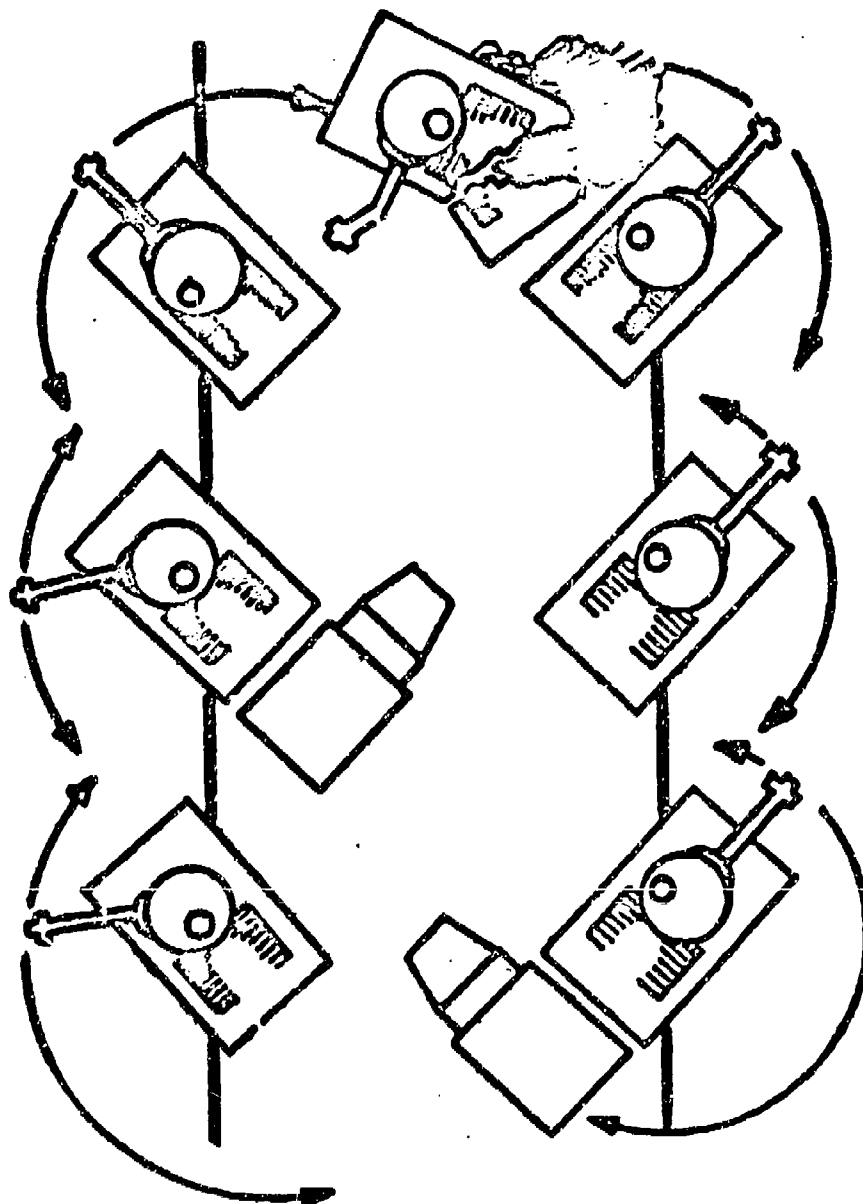
Security operations encompass a number of different activities. Among the various missions classed as security operations are convoy security, road security, base camp defense, defense of a fire support base, and protection of engineer work parties. Many of these missions are conducted in conjunction with search and destroy operations. A road security mission, for example, may be accomplished by establishing strong points along the road at the same time tank-infantry teams are searching the areas through which the road passes to locate ambushes or other hostile activity that would threaten the road.

Examples of armor success in road and convoy security would fill volumes but there were also a great number of failures. Usually success or failure depended not so much on the tank's physical characteristics as on the audacity and reactions of the tank commander. Ambushes initiated against an armor escorted convoy would inflict severe equipment and personnel losses if the tank commander did not react violently.

Most armor units were successful in countering a convoy ambush by immediately returning fire with all weapons and charging directly into the ambush site. Terrain and the size of the ambush force was not always conducive to this tactic. In this case the Armor unit returned the fire and assumed a herringbone formation. (Figure 26).

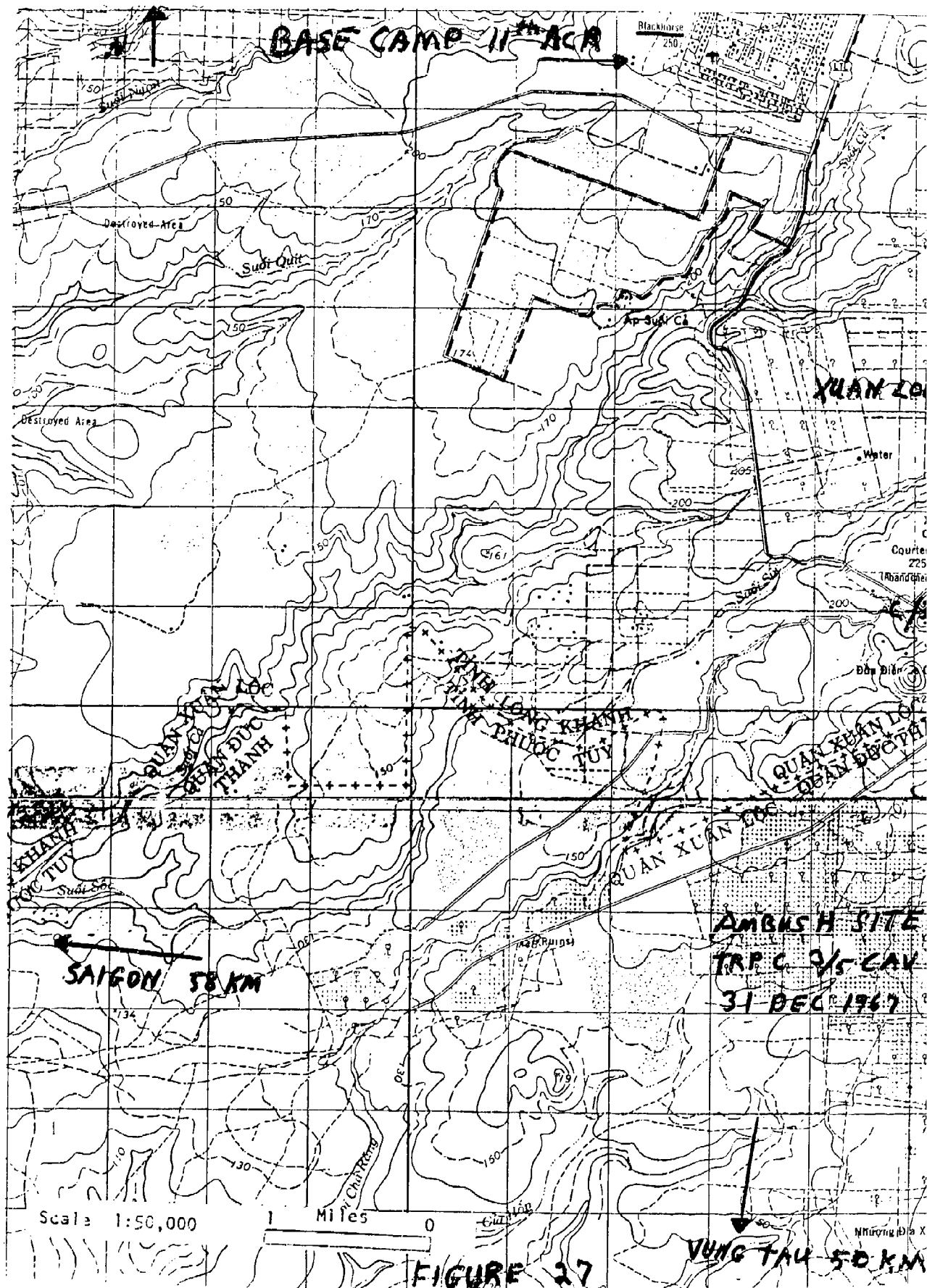
One of the most dangerous pitfalls in convoy security was to have insufficient forces in the securing unit. It was quite easy to be lulled into a false sense of security by a lack of enemy action in an area for an extended period of time. When this occurred, some commanders would gradually reduce the size of the security force while the size of the convoys were growing. When a commander fell into this trap, VC/NVA forces would capitalize on the situation and usually wreak great damage, if not total destruction, on a convoy. There was very little that a small security force of five to ten armored vehicles could do to counter an ambush against a convoy of 50-75 wheeled vehicles no matter how aggressive the actions of the escort.

An example of the disastrous effects of underestimating the enemy occurred on 31 December 1967 when Troop C, 3rd Squadron, 5th Armored Cavalry was assigned to the mission of escorting a 60-vehicle convoy from Vung Tau to the 11th ACR base camp known as Blackhorse. (Figure 27 and Figure 11). Only two platoons, consisting of



Herringbone Formation

FIGURE 26



two tanks, eight armored cavalry assault vehicles and one mortar carrier, were to perform the escort mission. Unfortunately, the troop commander assumed this sector to be secure and planned a routine tactical road march with the convoy.

Two platoons of Troop C left Blackhorse for Vung Tau at 0330 hours, 31 December, to pick up the convoy and return to Blackhorse. One platoon was to drop off approximately midway to Vung Tau and run the road to keep it open while the other platoon escorted the convoy.

Approximately nine kilometers from Blackhorse on Route 2, an enemy ambush erupted along a two-kilometer stretch of highway. An RPG round hit the lead tank killing the driver and stopping the tank in the middle of the road. A hail of RPG's quickly set the remaining vehicles of the lead platoon on fire and intense automatic weapons fire killed most of the personnel riding on top of the vehicles. A mortar track was hit by a command detonated mine which set off the ammunition inside and destroyed the vehicle. In the trail platoon, the other tank was hit by RPG fire, ran off the road, blew up and burned. Surprise was so complete that no organized fire was returned. When individual vehicles attempted to return fire, the enemy, firing from only 15 meters away, concentrated on that vehicle until the firing stopped. Within 10 minutes

the fight was over. Results of the ambush--four ACAV's and one tank destroyed, three ACAV's and one tank severely damaged and 42 men were casualties. There was no sign of any damage to the enemy.⁵³

It is only speculation, but the reason the enemy did not wait for the vehicles to return from Vung Tau with the convoy was probably because it would be daylight before the convoy returned and the enemy wanted the advantage offered by darkness. This American unit learned a tragic lesson. In guerilla warfare never assume that an area is secure.

This same situation applied to base camps and fire support bases. Many VC/NVA attacks against these positions were successful simply because the defending forces had grown complacent after months of no enemy activity in the area.

In base camp defense, armor units were normally used as ready reaction forces instead of being positioned around the perimeter. This technique allowed the base camp commander to determine in which area the main attack was being made before the armor unit was committed. Armor is ideally suited for this role since, in effect, this constituted a mobile defense which best utilized the

⁵³ Mounted Combat in Vietnam, Armor in Vietnam Monograph Task Force, Fort Knox, KY, 15 June 1976, pp. 80-84.

mobility, firepower and armor protection of the tank.

Many of armor's greatest successes in Vietnam were in defense of fire support bases, as a ready reaction force, or in a combination of both. Normally, in defense of a fire support base or laager, tanks and other armored vehicles would be situated around the perimeter with infantry positions in between the vehicles. A reserve, or ready reaction force, may or may not be used in this situation depending on the number of troops available. Quite often the administrative and support personnel may be used to constitute a reserve within the perimeter. If sufficient armor was available, the commander may have had a reaction force in another laager position two or three kilometers distance from the main fire support base. When the main base was attacked, the reaction force would be called to either reinforce the fire base by joining the forces in the perimeter or to attack the enemy force on the flanks.

A classic example which illustrates the use of a reaction force in both of these roles is the defense of Fire Support Base (FSB) 44 near Ap Bau Bang by elements of the 3d Squadron, 5th Armored Cavalry (3/4 Cavalry). (Figures 28 and 11).

TAY
NINH



BATTLE OF AP BAC
3/5 ARMORED CAVALRY
79-20 MARCH 1969

FIGURE 22

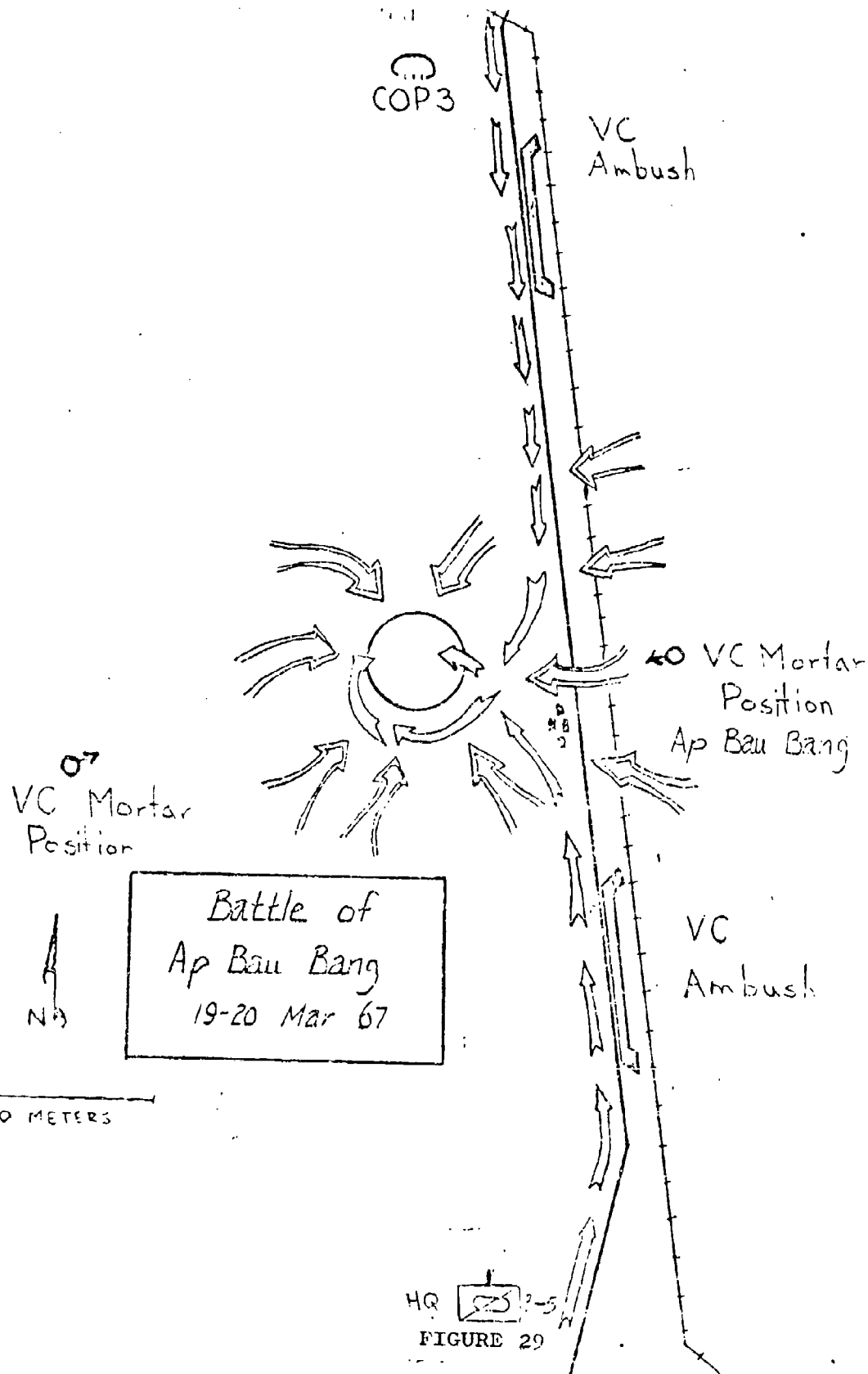
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FE KM

Battle of Ap Bac
3/5 Armored Cavalry

Troop A, 3/5 Cavalry, had been assigned the mission of securing Battery B, 9th Artillery, in FSB 44 and were to occupy Combat Outpost 3 (COP) approximately three kilometers north of FSB 44. (Figure 29). Two platoons were placed on the perimeter of FSB 44 while one platoon occupied COP 3. At approximately 2300 hours, 14 March 1967, a heavy caliber machine gun opened fire on the perimeter of the fire base from the north. Tank fire destroyed the gun and all was quite until just after midnight when the entire fire base came under fire from the east and west sides of the perimeter. A ground attack was launched against the south side of the perimeter using recoilless rifles, automatic weapons and small arms. All weapons of the defending platoons returned fire but the weight of the human wave attack soon pushed the enemy to the very edges of the perimeter. Some of the attackers were shot off of the tops of the ACAV's by tanks firing canister ammunition. Captain Alcalá, the troop commander, called his platoon from the COP to reinforce the perimeter. Enroute to the fire base, this platoon encountered an enemy ambush and literally overran it. Arriving at the fire base, the platoon fought its way into the perimeter and took up positions to reinforce the defenses. Meanwhile, helicopter gunships were providing aerial fire support.

As the intensity of the fighting increased, the



squadron commander, LTC Sydney Haszard, committed 3d Platoon of Troop C, placing it under control of Troop A. This platoon moved up from the south, attacked the rear of the enemy assault force with tank cannon and machine gun fire, then moved into the perimeter and took up positions to strengthen the defense. Colonel Haszard also attached the 1st Platoon of Troop B to Troop A which moved into the battle from the north, attacked around the southern half of the fire base then entered the perimeter from the west. At 0300 hours, 20 March, Air Force tactical aircraft were hitting enemy forces on the southeast side of the base. Forty-five minutes later the enemy terminated their attack and started withdrawing. All action ceased at 0500 hours and contact with the enemy was lost.

This armored cavalry troop, reinforced with an additional two platoons, had accomplished what no dismounted unit of comparable size could have done. They had killed over 400 of the enemy by actual body count, captured five prisoners and numerous crew-served and individual weapons, all at the cost of only four killed, one missing, and 38 wounded. Equipment losses were one mortar carrier and one M-113 ACAV destroyed and one F100 crashed.⁵⁴

⁵⁴MACOV, pp. 202-203; and Combat After Action Report, 3d Squadron, 5th Armored Cavalry, 30 March 1967, pp. 14-16.

There were a number of actions taken by the armored unit that could not have been taken by a dismounted unit. A dismounted unit would not have had the organic firepower to withstand the initial onslaught. When the attack closed on the friendly positions, only an armor unit could fire on their own positions with tank guns and not inflict casualties on their own troops. No dismounted unit could have responded so quickly to reinforce as the cavalry platoons did and they would not have been able literally to overrun an ambush enroute. Nor could they have made the sweeping attack between the perimeter and the enemy without taking an unacceptable number of casualties. In all likelihood only an armor unit could accomplish this feat.

While the battle of FSB 44 was drawing to a close, fate was shaping events that were destined to catapult armor onto the front pages of the newspapers. An operation code named Junction City II was getting underway in War Zone C just north of Tay Ninh. As a part of this operation, a Fire Support Base code named Gold was being established near an area called Soui Tre. (Figures 30 and 11). Two battalions, 3d Battalion, 22d Infantry (-) and 2d Battalion, 77th Artillery (-), were inserted by air into this area to man FSB Gold. Meanwhile, three other battalions were conducting search and destroy operations, as they moved from Tay Ninh to Soui Tre.

These units were 2d Battalion, 12th Infantry, TF 2/34 Armor, and TF 2/22 Infantry (Mechanized). Between these units and FSB Gold was the Samat Stream. (Figure 31). That evening, 20 March, all the battalions moved into laager positions for the night. TF 2/34 Armor was approximately 2,000 meters southwest of FSB Gold with TF 2/22 Infantry (M) two kilometers further south. Earlier that afternoon the scout platoon of the mechanized battalion had cleared a trail approximately 1,500 meters to the north before returning to the night laager position. However, the platoon had been unable to locate a ford across the Samat Stream which appeared to dwindle to the north. Colonel Ralph Julian, commander of the 2/22d Infantry (M), decided that on the next day his units would move north on that trail and upon reaching its end they would swing east and search for a ford across the upper reaches of the stream.

On the opposite side of the Samat Stream, infantrymen and artillerymen were improving the perimeter defenses of FSB Gold. Next morning, at 0630, an ambush patrol from Company B, 3/22 Infantry, engaged a large force of VC moving toward FSB Gold and simultaneously, the base came under heavy mortar attack. Over 600 rounds pounded the camp as waves of VC emerged from the jungle, firing recoilless rifles, RPG's, automatic weapons, and

small arms. Quickly overrun in the face of the onslaught, the ambush patrol was never able to return to the FSB. As the fight intensified, the armored units to the south were alerted, and ordered to cross the Samat Stream to reinforce the embattled fire base. Colonel Julian was told by Colonel Marshall Garth, the brigade commander, "to get in there and react to it." Colonel Julian immediately moved part of Company C and an attached tank platoon north on the trail established earlier by the scout platoon. Moving mounted, Colonel Julian's troops quickly reached the northern end of the trail. As the lead elements swung east and the remainder of the column closed, Colonel Julian was briefed on the situation at the fire base.

Conditions had worsened. Colonel Garth told him, "If a vehicle throws a track, leave it, let's get in there and relieve the force." With the personnel carriers straddling each others' paths in order to clear a trail wide enough for tanks, lead elements, using compasses, continued their search to the east, attempting to locate the Samat Stream and a trafficable ford.

Meanwhile, at Fire Base Gold, countermortar fire was employed to neutralize the heavy indirect fire which continued to pound the defenders. Enemy forces concentrated against the eastern side of the perimeter, and, at 0711, Company B reported that its 1st Platoon, manning the

southeastern portion of the perimeter, had been overrun. A reaction force of artillerymen had been dispatched to try to reestablish the perimeter. In spite of these efforts, at 0756, Company B reported that its 1st Platoon had again been penetrated. Seventeen minutes later positions on the northeastern portion of the company perimeter were completely overrun by an enemy human wave attack. Company A sent a reaction force with desperately needed ammunition to assist Company B. Minutes later, on the northern perimeter, the crew of one of the two quad 50's located at the base was killed by an RPG round. As the attacking VC swarmed over the weapon in an attempt to turn it on the defenders, the gun was blown apart by a round from a 105 mm howitzer. Company A was also reporting penetrations in portions of its northern perimeter.

The urgency of the situation was again conveyed to Colonel Julian by Colonel Garth's admonition that the stream would be crossed "even if you have to fill it up with your own vehicles and drive across them." Using a helicopter to assist in selection of the route, the armored column was finally able to cross the Samat Stream. Task Force 2/22 Infantry (M) linked up with TF 2/34 Armor and both units moved toward FSB Gold. To the northwest, the 2d Battalion, 12th Infantry, was advancing on foot to reinforce the fire base. In the air, Colonel Julian

directed Lieutenant Colonel Joe Elliot, commander of 2/12 Infantry, to secure the western sector of the fire base by deploying north along a 500 meter front once his unit entered the clearing. All mechanized forces were ordered to enter just south of the 2/12 Infantry and swing around the perimeter consolidating the northern, eastern, and southern sectors of the clearing.

Meanwhile on the smoke covered battlefield, the defender's situation had become desperate. Artillerymen were firing beehive rounds set at muzzle action into the hordes of VC. When the supply of beehive was exhausted, they switched to firing high explosive direct fire at point blank ranges. The eastern sector of the perimeter had fallen back under heavy pressure to secondary positions around the artillery pieces. Viet Cong were within five meters of the battalion aid station, and within hand grenade range of the battalion command post.

Into this chaos roared the tanks and personnel carriers crashing through the last few trees and charging into the smoke filled clearing. (Figure 31). Captain Howard Hill, commander of Company A, 2/34 Armor, looking into a foxhole to his flank, was greeted by several U.S. soldiers who were obviously extremely glad to see the tracks. As he looked to his other flank the reason became obvious--the VC were advancing in the vicinity of

the artillery pits through a flurry of explosions. Opening up with more than 200 machine guns and 90-mm tank guns, the new arrivals shook the ground as tracked vehicles moved around the perimeter throwing up a wall of lead to their outside flank. They cut through the advancing VC, crushing many of them under their tracks. In desperation, the VC, realizing they could not outrun the encircling tracks, charged the vehicles, attempting to climb aboard. They were quickly cut down. Captain Hill's tank recovery vehicle smashed through the trees with its caliber .50 machine gun firing and most of the crew throwing grenades. However, one calm soul, a mechanic, sat serenely atop the vehicle his movie camera grinding away at the episode unfolding before him. Relief was evident in the faces of the defenders as the track vehicles quickly tied in with the 2/12 Infantry.

When the smoke cleared and silence prevailed, it became evident that the enemy, victory almost within grasp, had suffered a devastating defeat, losing over 600 men. Weapons of the tanks and APC's had turned the tide at the last moment.⁵⁵

Reactions of the men in this besieged position were of ecstatic joy at the sight of the tanks and APC's.

⁵⁵ Monograph, Chapter IV, pp. 29-36.

As Lieutenant Colonel John A. Bender, commander of 3/22 Infantry said, "it was a real 10 o'clock movie ending. The cavalry came to the rescue."⁵⁶ Master Sergeant Andrew Hunter was even more exuberant. His sentiments were: "They haven't made the word to describe what we thought when we saw those tanks. It was dee-vine."⁵⁷

Time magazine described the armor column's arrival on the scene:

Just as the Americans at Soui Tre were about to be overrun entirely, the delayed column of 80 armored personnel carriers and tanks rumbled through the trees. As they came, they crushed the masses of Viet Cong beneath their treads and sprayed the enemy ranks with withering machine gun fire. Hands popped from tank turrets and dropped grenades to blast off Viet Cong fighters who had swarmed over their steel shells. When the Viet Cong finally grasped what they were up against, they hastily retreated.⁵⁸

Bender was also quoted as saying "we were almost rhapsodic when we saw them lumbering into view. We knew we had won, then."⁵⁹

Documents and POW's identified the Viet Cong units as the 272 Main Force Regiment reinforced by two additional battalions which were long considered to be a crack unit, one of the enemy's best.

⁵⁶Washington Post, March 23, 1967, A17, Col. 7.

⁵⁷Newsweek, April 3, 1967, p. 40.

⁵⁸Time Magazine, March 31, 1967, p. 26.

⁵⁹The Tacoma-News Tribune, March 23, 1967.

A comparatively small price was paid by the Americans for this significant victory. Only 31 men were killed and 187 wounded.⁶⁰ There is little doubt that the story would have ended quite differently had armor not been available to assist the men of FSB Gold. In all likelihood, the FSB would have been overrun at the expense of the majority, if not all, of the defenders. Other infantry units could have reinforced eventually, but they would have to have been air lifted, landed away from the battle area, then made their way through the jungle in much the same manner as 2/12 Infantry. Time lost in assembling a sizeable force, locating enough helicopters, flying to the scene and hacking through the jungle would probably have cost the defenders heavily.

If there had ever been any doubt concerning armor's value in Vietnam prior to this battle, it should have been removed once and for all. This was not the case, however, since the small amount of armor in Vietnam never increased to a sufficient level.

Armor Employment by VC/NVA Forces

Prior to 1968 there were few, if any, in Vietnam that even imagined the VC/NVA forces in South Vietnam

⁶⁰ Garth, Marshall B., Colonel, Personal letter to wife, extract, Armor Monograph files, Patton Museum, Fort Knox, KY, 28 March 1967.

were equipped with tanks. A few in the intelligence system, exercising hindsight, made "I knew it all the time" claims but these statements deserved and received little attention. Events of 24 January to 7 February 1968 provided these enlightened ones with their information.

On 24 January a Forward Air Controller (FAC) spotted five enemy tanks only a few kilometers from the Lang Vei Special Forces Camp in the northwestern corner of South Vietnam. An air strike was called and one of the tanks was reported destroyed.

That same day the 33d Royal Laoians were reportedly attacked by NVA forces utilizing tanks. Survivors of this engagement, along with their families, retreated into South Vietnam and were allowed to occupy old Lang Vei Camp previously abandoned by the Special Forces. A new camp had been established further to the west.

Late in the evening of 6 February a force of approximately 400 infantry and twelve Soviet-built tanks attacked the Special Forces Camp at Lang Vei. (Figures 32 and 11). Some of the tanks were identified as the PT-76 Amphibious Tank. Antitank weapons available to the camp defenders were M-72 LAW's and two 106 mm Recoilless Rifles. Three enemy tanks were destroyed by the recoilless rifles before the guns were destroyed by tank fire. Performance of the M-72 LAW proved disappointing since many of them

malfunctioned and would not fire or when they did fire did very little damage to the tanks with few exceptions. Armor thickness on the PT-76 is roughly comparable to the U.S. M-551 Sheridan. Both are relatively thin-skinned and are easily penetrated by light antitank weapons.

Lang Vei was completely overrun and destroyed by the NVA tanks and infantry. Surviving American Special Forces were forced into hiding in an underground bunker and most of the South Vietnamese were either killed, captured or forced to flee. American air force and artillery provided support throughout most of the battle, but could not prevent the NVA from taking the camp. American armor was not readily available to support the Special Forces. Only the Marines had tanks in the I Corps zone. It was this battle which caused Headquarters, U.S. Army, Vietnam, to move an armored cavalry squadron and a tank company from the III Corps zone to counter any further enemy armor threat.

Results of the battle of Lang Vei were ten of the twenty-four Americans and 209 South Vietnamese were killed or missing. An additional 77, including 13 of 14 Americans, were wounded.

Estimated losses to the NVA were seven tanks

destroyed and 250 infantry troops killed.⁶¹ With nearly a two-week warning of enemy tanks operating in the area, no attempt was made to reinforce the camp with U.S. tanks. This is unfortunate since the M48A3 completely outguns the PT-76 and could have prevented the camp's destruction and the high casualty rate suffered by the defenders. A costly lesson had been relearned. This was the first, but by no means the last, time the enemy was to employ armor in Vietnam.

Ben Het Special Forces Camp was the location of the next NVA armor attack. (Figures 33 and 11). Ben Het overlooked the Ho Chi Minh trail in an area where the borders of Cambodia, Laos and Vietnam met. A battery of U.S. 175 mm artillery was located in this camp and the NVA had made numerous attempts to destroy the guns and blind the camp occupants to their movement by almost incessant artillery, rocket and mortar barrages.

Having failed to destroy the camp by indirect fire, an NVA armored unit launched a ground attack against the base on 3 March 1968. This battle was not to be a one-sided affair like Lang Vei because a U.S. tank platoon from Company B, 1/69 Armor, was part of the camp defenses. An estimated seven enemy tanks

⁶¹ Combat After Action Report, Battle of Lang Vei, 5th Special Forces Group (Airborne), 1st Special Forces, 24 January - 7 February 1968, pp. 4-6, 30-37.

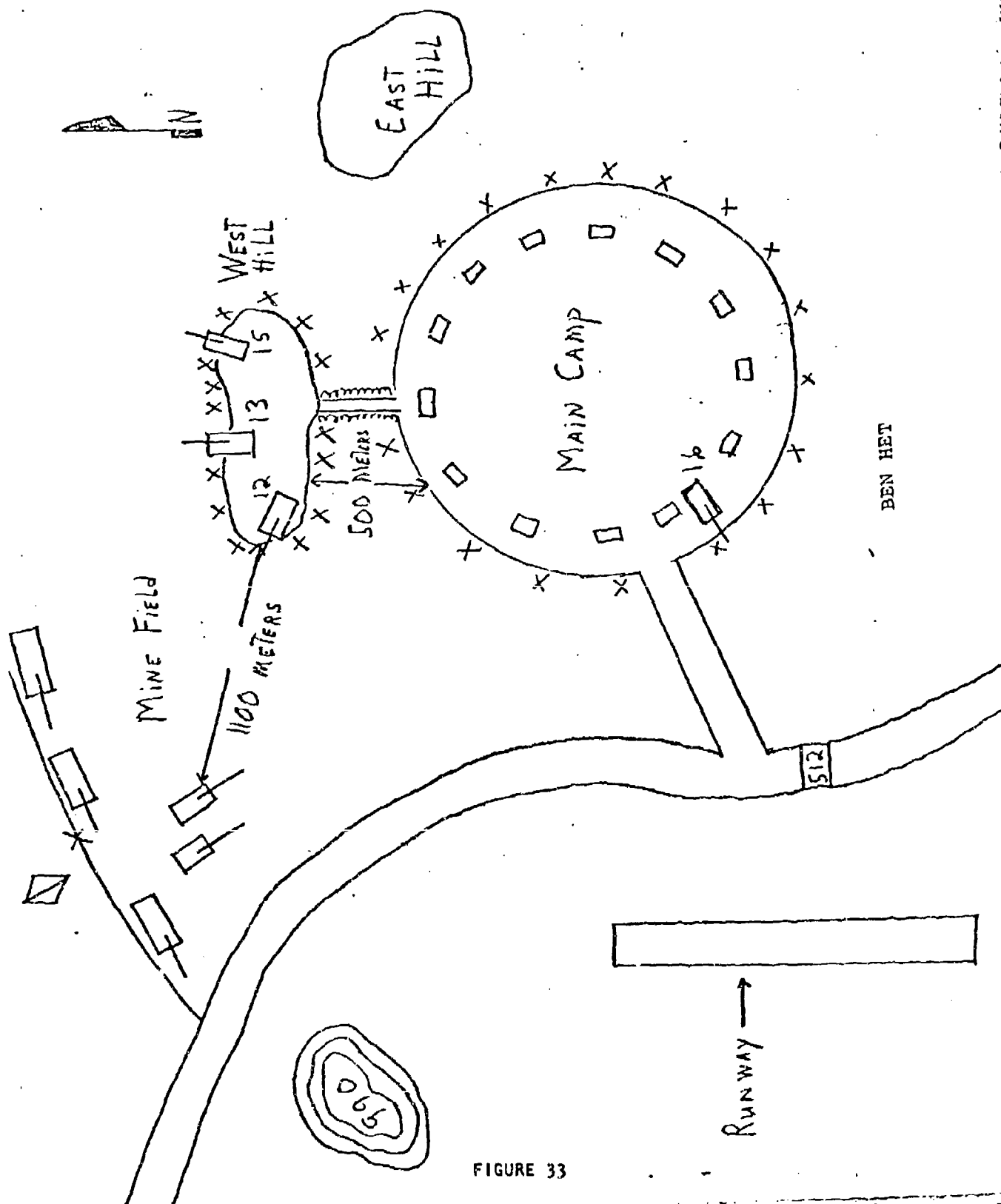


FIGURE 33

participated in the attack, two of which were destroyed by the U.S. tanks in addition to an armored personnel carrier. None of the U.S. tanks were destroyed. This attack was not supported by infantry and was not of the magnitude of the attack against Lang Vei. This battle marked the only time U.S. tanks engaged in a tank versus tank engagement in Vietnam.⁶²

June 1969 signaled the beginning of the American withdrawal from South Vietnam. Only one U.S. tank battalion, 1st Battalion, 77th Armor, was operating in the I Corp area and this unit was scheduled to leave the country in mid-1971. General Creighton W. Abrams, Commander, U.S. Forces in Vietnam, wisely authorized the formation of the 20th ARVN Tank Regiment to provide some armor capability to the I Corp zone.

With U.S. ground combat actions at an end, the NVA launched a major offensive operation against the South Vietnamese in April 1972. This major attack was supported by strong NVA tank forces equipped with Soviet T-54 and T-34 tanks.

On 2 April 1972, 20th Tank Regiment, equipped with U.S. M48A3 tanks, met the forward elements of the NVA tank column on the north side of Dong Ha along the

⁶²Armor Monograph, Chapter VI, p. 60-68.

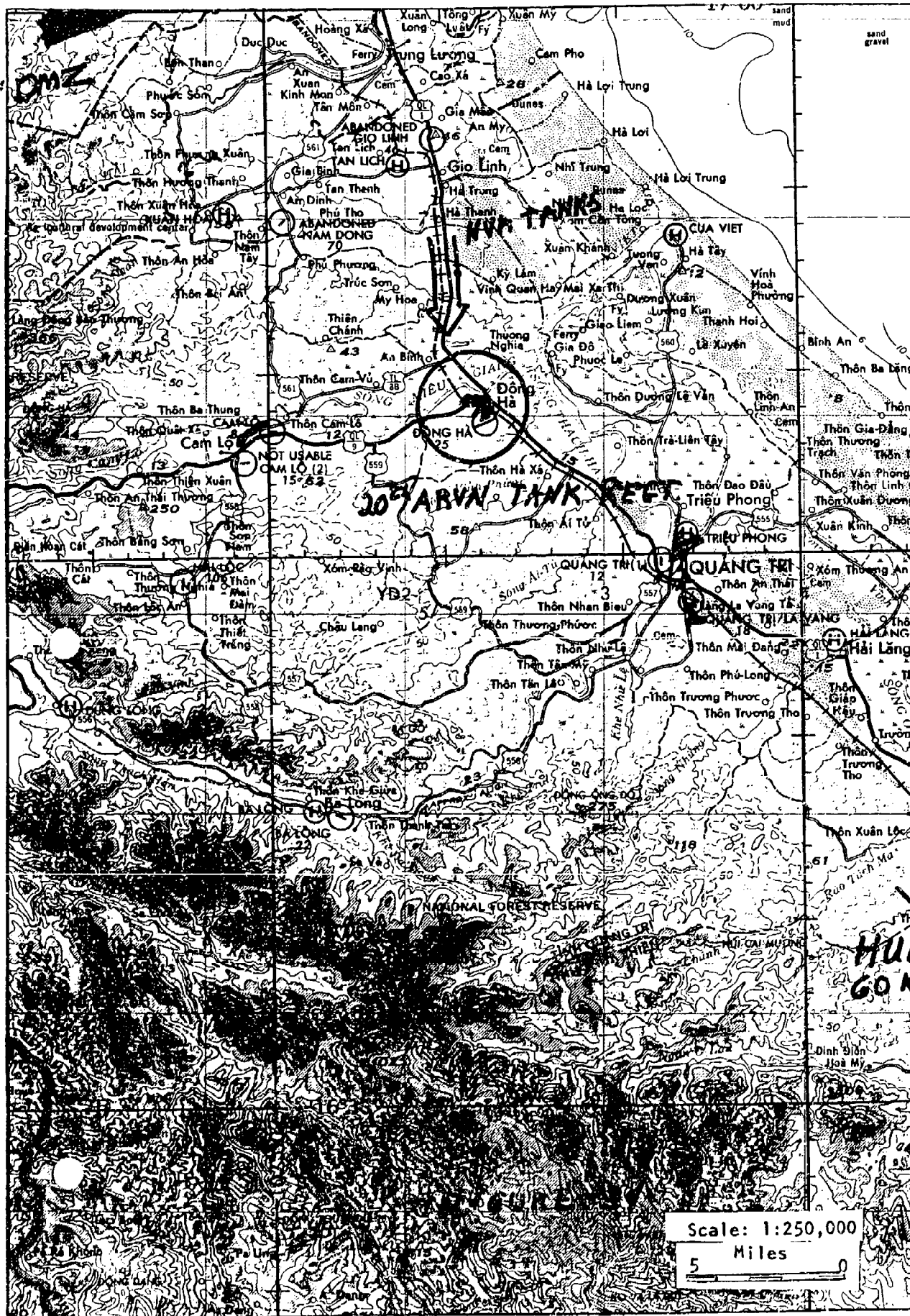
Mieu Giang River. (Figures 34 and 11). Six NVA tanks were destroyed by the ARVN tankers in the first few minutes. Combined efforts of 20th Tank Regiment, South Vietnamese Air Force and ARVN Marines stopped the NVA advance at the Dong Ha bridge. That night the ARVN tanks used their searchlights to illuminate the river and expose boatloads of NVA troops attempting to infiltrate. All tank weapons were used in conjunction with infantry fire to destroy the boats and NVA troops.

During the period 2 April to 1 May, this newly formed tank regiment accounted for 37 NVA tanks destroyed, one captured and a significant number of enemy infantry killed. While 20th Tank Regiment paid a high price in personnel casualties and equipment losses they were a major factor in delaying the NVA onslaught for nearly a month. This time was used by the ARVN high command to reinforce the I Corp area with sufficient forces to stop the NVA drive.⁶³

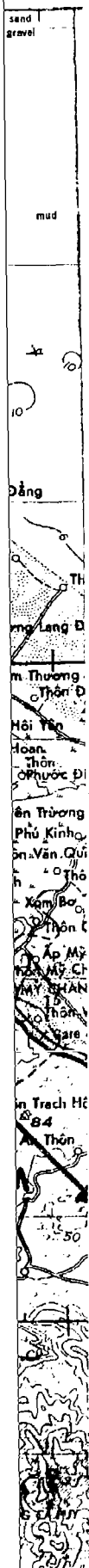
Tanks were also used by the NVA in other parts of South Vietnam during this major offensive, most notably in the vicinity of An Loc and Loc Ninh.

Total victory was denied the VC/NVA forces in

⁶³Wagner, Louis C., Colonel, Letter to Headquarters, U.S. Army Armor School, Fort Knox, KY, 30 August 1973, Patton Museum Library, Fort Knox, KY.



this offensive primarily because of the massive air support rendered by U.S. air power to the ARVN ground and air forces. When the next major offensive was launched by the VC/NVA, South Vietnam forces were on their own and were totally routed by the tank-infantry drive from the north. Not only had the U.S. forces proven that tanks could be used effectively in Vietnam, but so did the NVA.



III. LESSONS LEARNED--CONCLUSION

During the period that U.S. forces were fighting in Vietnam, each unit was required to submit a quarterly report entitled "Operation Report--Lessons Learned," (ORLL). These reports covered every aspect of the war. Literally thousands of items were reported describing ways in which most tasks to be performed in Vietnam could be done better or confirming established procedures. Most of these reports have been microfilmed but in the format in which they were submitted they would require thousands of cubic feet of storage space. It can be assumed, therefore, that an untold number of lessons were learned by the Americans in Vietnam. Just as many lessons were learned in World War II and Korea. The question which requires consideration is not what was learned, but how much of it will be heeded, not only by present members of the armed forces but by those in the future.

A wealth of information was readily available to army planners on the experiences of jungle fighting in the Pacific in World War II, operations in rugged terrain laced with rice paddies in Korea, the French armor experience in Vietnam, and over twenty years of counter-insurgency operation by the British in Malaya. Most of it was ignored.

Artillery and infantry generals made major decisions covering armor operations that were counter to the advice of experienced armor generals. A lesson was learned in Vietnam that it was a mistake to ignore this advice. The mistake need not have been made, however.

Recognition of the mistake did not lead to complete rectification. Token armor units were forced to fill a role requiring three to five times the armor strength present in Vietnam. This resulted in unnecessary losses to both armor and infantry due to piecemeal employment and an almost impossible logistics and maintenance problem.

It was demonstrated conclusively by both the Americans and the NVA that armor had a major role to play in an area war such as Vietnam. This is probably the most significant lesson that was learned. But the question remains unanswered as to whether or not it will be remembered the next time the occasion arises.

Just as the positive aspects of armor employment were a lesson learned, so were the tank's limitations and vulnerability. The reminder that antitank mines are a major threat that must be dealt with was vividly demonstrated. Studies are underway to find a solution to this problem. Destruction of a tank from detonation of the basic load by antitank weapons has led to improvements in ammunition storage in future tanks.

The flexibility of an armored cavalry regiment and armored cavalry squadrons was demonstrated when these units were employed as maneuver forces in much the same way as a tank-infantry team.

Air mobility concepts, using the helicopter, were proven in battle for the first time. This lesson could be a two-edged sword if it is not remembered that the success of air mobility in Vietnam was largely due to air superiority by friendly forces and the absence of sophisticated enemy anti-aircraft systems for most of the war.

Lessons were learned in armor doctrine. Missions assigned to the tank battalion were performed with success, albeit with different terminology applied to these missions. Classic doctrine for the armored cavalry regiment was illustrated during the Cambodian incursion by the 11th ACR in which they moved from an attack position, crossed a line of departure, attacked up an axis of advance, made a passage of lines, linked up with an air mobile assault, attacked a fortified position and exploited their success.

In conclusion, one can only hope that mistakes of the past will not be repeated a third time. Armor is a potent striking force when properly employed and supported. Its employment is limited only by the imagination, ingenuity and drive of the commander. Terrain conditions can limit armor's employment but they rarely

prevent it, for terrain conditions in most of the world are less than ideal for other weapons systems. A terrain obstacle may be an asset to a defender and a handicap for an attacker or vice versa. A battle may not be postponed or a war ended because of a terrain obstacle. It is merely one item to be considered during the planning.

Many victories have been won because of an attack through unfavorable terrain considered impassable by a defender. Timidity and caution do not win wars. Boldness and audacity are the traits of the winner.

Tanks are considered the primary ground offensive weapon of the army. To fight with only part of an army's strength is like fighting with one hand tied behind the soldier's back and is sheer folly. Hopefully, the decision makers of the future will remember to use both hands.

BIBLIOGRAPHY

BIBLIOGRAPHY

Books

- Coleman, J. D., Major, (ed.). The 1st Air Cavalry Division, Vietnam. Dia Nippon Printing Co., Tokyo, Japan, 1970.
- Fitzsimons, Bernard, (ed.). Tanks and Weapons of World War I. BCP Publishing Ltd., London, 1973.
- Gillie, Mildred Hanson. Forging the Thunderbolt. The Military Series Publishing Company, Harrisburg, PA, 1947.
- Guderian, Heinz. Panzer Leader. Ballentine Books, Inc., New York, 1957.
- Hart, B. H. Liddell. The Tanks, Vol. I, 1914-1939. Frederick A. Praeger, New York, 1959.
- Hart, Liddell. The Tanks, Vol. II, 1939-1945. Frederick A. Praeger, New York, 1959.
- Jones, Ralph E. The Fighting Tanks Since 1916. National Service Publishing Company, Washington, D.C., 1933.
- Macksey, Kenneth. Tank Warfare. Stein and Day, New York, 1972.
- Macksey, Kenneth, and Batchelor, John H. Tank, A History of the Armored Fighting Vehicle. Charles Scribners Sons, New York, 1970.
- Ogorkiewicz, Richard M. Armor, A History of Mechanized Forces. Frederick A. Praeger, New York, 1960.
- Ogorkiewicz, Richard M. Armour. Atlantic Books, Steven and Sons, Ltd., 1960.
- Puchalski, R. Vincent, Specialist 5th Class. Tropic Lightning, 25th Infantry Division. Albert Love Enterprises, Inc., Doraville, GA, 1967.
- Skillman, Willis Roweland. The A.E.F. George W. Jacobs & Company, Philadelphia, PA, 1920.

Westmoreland, William C. A Soldier Reports. Doubleday and Company, New York, 1976.

Whitehouse, Arch. Tank. Modern Literary Editions Publishing Company, New York, 1960.

Government Publications

Armor Reference Data, Vol. I. The Army Division, U.S. Army Armor School, Fort Knox, KY, January 1974.

Berry, Sidney B., Jr., Col., Infantry, Commander, 1st Brigade, 1st Infantry Division, June 1966 - February 1967. Operational Report, Lessons Learned, Observations of a Brigade Commander. Headquarters, 1st Infantry Division, 27 December 1967.

Choinski, Walter F. Country Study: Republic of Vietnam. The Military Assistance Institute, Department of Defense, Washington, D.C., 1965.

Chronology of Significant Events. Armor Monograph Files, Patton Museum, Fort Knox, KY.

Combat After Action Report. 3d Squadron, 5th Armored Cavalry, 30 March 1967.

Combat After Action Report, Battle of Lang Vei. 3th Special Forces Group (Airborne), 1st Special Forces, 24 January - 7 February 1968.

Extract of message, MACV to CSA, 051230 Jul 65. U.S. Army Chief of Military History Files, Washington D.C.

Extract of message, CSA to MACV, 03213Z, Jul 65.

FM 17-1, Armor Operations. Department of the Army, October 1966.

FM 17-15, Tank Units, Platoon, Company and Battalion. Department of the Army, March 1966.

Greenfield, Kent Roberts. The Army Ground Forces. The Organization of Ground Combat Troops, Historical Division, Department of the Army, Washington, D.C., 1947.

Johnson, L. M., Jr., Col. Combat After Action Report.
Headquarters, 2nd Brigade, 25th Infantry Division,
30 April 1966.

Mechanized and Armor Combat Operations in Vietnam. (MACOV),
Department of the Army, 28 March 1967.

Mounted Combat in Vietnam. Armor in Vietnam Monograph
Task Force, Fort Knox, KY, 15 June 1975.

Schnabel, James F. United States Army in the Korean War,
Policy and Direction: The First Year. Office of
the Chief of Military History, United States Army,
Washington, D.C., 1972.

Special Text 17-12, History and Role of Armor. U.S. Army
Armor School, Fort Knox, KY, April 1974.

Special Text 17-12, History and Role of Armor. U.S. Army
Armor School, Fort Knox, KY, December 1971.

Starry, Donn A., Col. (now MG). 11th Armored Cavalry
Regiment, Senior Officers Debriefing Report, 7 Decem-
ber 1969 - 7 June 1970.

Stubbs, Mary Lee, and Connor, Stanley Russell. Armor-
Cavalry, Part I. Office of the Chief of Military
History, U.S. Army, Washington, D.C., 1969.

Stubbs, Mary Lee, and Connor, Stanley Russell. Armor-
Cavalry, Part II: Army National Guard. Office
of the Chief of Military History, United States
Army, Washington, D.C., 1972.

Table of Organization and Equipment Number 17. War
Department, Washington, D.C., 15 September 1943.

Tolson, John J., LTG. Vietnam Studies, Air Mobility,
1961-1971. Department of the Army, Washington,
D.C., 1973.

Periodicals

Newsweek, April 3, 1967.

The Tacoma-News Tribune, March 23, 1967.

Time Magazine, March 31, 1967.

Washington Post, March 23, 1967.

West, Arthur L., Jr., MG, and Starry, Donn A., Col.
"Armor in an Area War." Armor Magazine, Washington,
D.C., September-October 1968.

Personal Interviews

Higgins, Robert W., Maj., Infantry, Executive Officer, 2d
Battalion, 58th Infantry (Mechanized). Personal
interview. Fort Hood, TX, 12 March 1976.

Jones, William W., Jr., LTC, Chief, Advanced Tactics Divi-
sion, Command and Staff Department, U.S. Army
Armor School. Personal interview. U.S. Army
Armor School, Fort Knox, KY, 9 December 1975.

Kirkland, Wade, Maj., How to Fight Task Force. Personal
interview. U.S. Army Armor School, Fort Knox,
KY, 16 March 1976.

McIntosh, Andrew K., LTC, Fourth Royal Tank Regiment,
British Exchange Officer, U.S. Army Armor School.
Personal interview. U.S. Army Armor School,
Fort Knox, KY, 16 March 1976.

Starry, Donn A., Lieutenant General, Commander, U.S. Army
Armor Center. Personal interview. U.S. Army Armor
Center, Fort Knox, KY, 12 December 1975.

Starry, Donn A., Lieutenant General, Commander, U.S. Army
Armor Center. Personal interview. U.S. Army Armor
Center, Fort Knox, KY, 28 January 1976.

Totten, James P., Cpt., How to Fight Task Force. Personal
interview. U.S. Army Armor School, Fort Knox,
KY, 16 March 1976.

West, Arthur L., Jr., MG. Personal interview. Auburn
Hill Farm, Bowling Green, VA, 19 September 1975.

Westmoreland, William C., General. Personal interview.
Grandfather Mountain Golf and Country Club,
Grandfather Mountain, NC, 21 September 1975.

Personal Letters

Garth, Marshall B., Col. Personal letter to wife, extract.
Armor Monograph Files, Patton Museum, Fort Knox,
KY, 28 March 1967.

Neely, Robert A., Infantry. Letter to Chief, Armor Mono-
graph Team, Fort Knox, KY, 20 May 1974. Armor
Monograph Files, Patton Museum, Fort Knox, KY.

GLOSSARY

GLOSSARY

Armor - A term normally used to refer to tanks and other armor-protected, track-laying weapons systems. Also used to describe a concept of operations which include the combined arms team of tanks, mechanized infantry, self-propelled artillery, armored cavalry, air cavalry, air force, armored engineers, and signal, with the tank as the primary assault weapon.

Ammunition

Beehive rounds - Antipersonnel projectiles fired by artillery and tank guns. Each projectile is filled with many sub-projectiles, which are shaped like a small dart. A Beehive projectile usually contains a burster charge which can be set to explode at various ranges spraying thousands of these dart-shaped sub-projectiles. The term "beehive" is often used erroneously with the term "canister." Canister projectiles do not contain a burster charge but instead have a flat front surface and tapered sides which cause the projectile to tear apart much like a banana being peeled. Additionally, the sub-projectiles may be small, cylindrical-shaped, steel pellets instead of darts. The 90 mm

canister fired by the M48A3 tank used in Vietnam used both types of canister, those with the pellet type sub-projectiles and those with the darts. The 152 mm gun/launcher on the M-551 Sheridan also fired canister ammunition.

Canister - see beehive.

Chemical energy ammunition - A hollow charge or shaped charge projectile which penetrates armor by the formation of an extremely high velocity jet stream which physically displaces the molecules in the metal to create an opening.

Consumable cartridge case - A cartridge case made of a combustible material which is consumed in the chamber of the gun when the gun is fired. This type of case is currently used by the 152 mm gun/launcher on the M-551 Sheridan and the M60A2 tank. This case is used on the conventional ammunition only and not on the missile which is also fired by these systems.

Kinetic energy ammunition - A type of projectile fired by tanks which is a solid material and used against tanks and other hard targets. Penetration of the target is achieved by mass and velocity of the projectile.

Jet Stream - See Chemical energy ammunition.

Armored Vehicles (Except Tanks)

ACAV (Armored Cavalry Assault Vehicle) - A modified version of the M113A1 Armored Personnel Carrier used extensively in Vietnam by scout platoons of armored cavalry squadrons, tank battalions and mechanized infantry battalions. Addition of armor shields for the vehicle commander's caliber .50 machine guns and two additional shield-protected M-60 machine guns is the only physical difference between the ACAV and the M113A1 Armored Personnel Carrier.

Crew: 4 (some units had 5-man crews by placing a grenadier to fire from the rear of the crew compartment).

Armament: One caliber .50 machine gun, two 7.62 mm machine guns (one M-79 Grenade Launcher with fifth man).

Maximum speed: 42 MPH

Weight: 11.3 tons

Engine: GMC V8 diesel, 215 horsepower

Cruising range: 300 miles

AVLB (Armored Vehicle, Launch Bridge) - A tank chassis with a 63-foot span of folded scissors-type

Napalm - A chemical mixture equating to jellied gasoline which is dropped by aircraft in a container (napalm bomb) with an igniter which burns with a fierce intensity--approximately 23,000 degrees fahrenheit. This same material is used in flame throwers either mounted on armored vehicles or portable units carried by a single soldier.

Round (of ammunition) - A complete round of ammunition is comprised of four primary components: a projectile, that portion of the round which leaves the gun, and inflicts the damage on a target; a propelling charge, that portion of the round which burns with explosive force to propel the projectile from the gun; a casing, that portion of the round which contains the propelling charge and has the projectile affixed to the end of it; a primer which produces an initial flash to ignite the propelling charge. A round, therefore, is one complete item of ammunition.

Shillelagh missile - An antitank missile fired by the 152 mm gun/launcher of the M-551 Sheridan and the M60A2 tank. A combination of an on-board guidance system and a vehicular mounted guidance system keeps the missile on target after launch.

bridge mounted on top. The bridge span is launched hydraulically from the driver's compartment without exposing the crew. Capable of spanning a 60-foot gap and strong enough to support a main battle tank. May also be recovered without exposing the crew. Organic to tank battalions, armored engineer battalions and engineer bridge companies.

Crew: 2

Armament: None

Maximum speed: 32 MPH

Weight: 65 tons

Engine: Continental V12, 750 horsepower, air-cooled diesel.

Cruising range: 300 miles.

Half-track - An early version of the armored personnel carrier with wheels on the front and tank-like track system on the rear. This vehicle was used in a number of configurations but primarily as an infantry carrier in World War II. Inherent weaknesses were its limited cross-country mobility and lack of overhead protection.

Crew: One (driver), 12 passengers

Armament: One caliber .30 machine gun

Maximum speed: 45 MPH

Weight: 10 tons

Engine: White, 6 cylinder, 160 horsepower

Cruising range: 200 miles

M8 Armored Car - A World War II, lightly armored, wheeled reconnaissance vehicle. Thousands of these six-wheeled vehicles were manufactured by the Ford Motor Company for the U.S. Army. The chassis was used in a number of different configurations but the most common was one with a small turret mounting a 37 mm gun. This vehicle was used by French armor units in Vietnam and is still in use in a number of small countries receiving U.S. aid.

M113A1 Armored Personnel Carrier (APC) - Standard armored infantry carrier of the army today. A light amphibious, air droppable carrier capable of carrying a full infantry squad (11 men). Used extensively by armor and mechanized units in Vietnam.

Crew: 1 (driver is the only crewman assigned to the vehicle)

Armament: One caliber .50 machine gun

Weight: 11.3 tons

Engine: GMC V8 diesel, 215 horsepower

Cruising range: 300 miles

M113A1 Marginal Terrain Assault Bridge (MTAB) - Standard

M113A1 APC chassis with a 33-foot folded bridge mounted on top. Bridge unfolds hydraulically like the AVLB. Originated in Vietnam for areas impassable to the much heavier AVLB. With the bridge folded, the vehicle is still amphibious.

Crew: 2

Armament: One caliber .50 machine gun

Maximum speed: 42 MPH

Weight: 12 tons

Engine: GMC V8 diesel, 215 horsepower

Cruising range: 300 miles

M88 Vehicle, Tank Retriever (VTR) - A medium recovery vehicle organic to tank battalions, armored engineer battalions, heavy self-propelled field artillery battalions and armored cavalry units. As the name implies, the primary mission of this vehicle is the recovery of tanks and other heavy tracked vehicles. Recovery may consist of towing a disabled tank, battlefield evacuation of damaged tracked vehicles or extraction when struck. This mission represents only one aspect of this very able vehicle's capabilities. It is virtually a mobile repair shop carrying heavy tools and welding equipment and has a hoist with which to lift tank engines and small vehicles.

Crew: 4

Armament: One caliber .50 machine gun and 18 hand-held M-72 LAW's.

Weight: 56 tons

Engine: Continental V12, air-cooled, 980-horsepower

Cruising range: 222 miles

ARVN - Army of the Republic of Vietnam

Base Camp - A semi-permanent, garrison-like location for units in Vietnam where the unit could stand-down from combat operations for a rest and maintenance. Normally had such facilities as a club and PX.

Basic load (tank ammunition) - That amount of ammunition stowed on the tank in spaces provided by the tank design and authorized by the theater commander. Consists of 105 mm, 7.62 mm, caliber .50, caliber .45 and various hand grenades. Mix of the 105 mm ammunition will vary depending on unit location. In Europe, for example, the tank would be stocked with a high ratio of armor-defeating ammunition whereas in Vietnam the main gun ammunition (90 mm) was predominantly antipersonnel.

Battalion trains area - An area in which the supply and maintenance elements of the division operate to receive supplies from larger supply elements and

in which maintenance and other support operations can be performed.

Battery (of artillery) - Subordinate unit of an artillery battalion. Normally has 18 howitzers.

Breakthrough - A term used interchangeably with penetration--to rupture an enemy defense line and widen the gap to allow other forces to advance through the defense line to disrupt and destroy enemy positions and defenses.

Collective protector (tank) - A system used by American tanks to protect the crew from chemical agents. Consists of a central filtering unit with a separate mask and attaching air hose for each crew member.

Crew-served weapon - A weapon requiring more than a single individual to operate, such as tanks, artillery pieces, recoilless rifles, etc.

Cryptographic - Refers to communication equipment used to encode and decode signal transmissions.

Cupola - That portion of a tank turret used by the tank commander which mounts a caliber .50 machine gun and sight and can be rotated independently of the turret. Actually it is a small turret on top of the main turret. Provides all-around

vision for the commander and protection from overhead artillery when the hatch is closed.

"Dead Man" - Pertains to vehicle recovery operations wherein a vehicle operating alone digs a deep trench in the ground, places a log or like item in the trench to attach a cable or chain to. The log is the "dead man."

Exploitation - That phase of an offensive operation which uses armor forces to take advantage of a penetration in the enemy defenses by the use of speed and firepower to rapidly move into the enemy's rear area to prevent the organization of defenses and to destroy rear area installations.

FAC (Forward Air Controller) - A qualified Air Force Pilot operating on the ground with the Army in forward areas to advise the ground commander in the use of air support and to assist and guide the pilots of strike aircraft.

Fire Support Base (FSB) - A position established in an operational area of Vietnam to allow artillery to fire on enemy locations and to support armor and infantry operations in a given area. These bases were secured by infantry or armor units or both depending on size and location of the base.

Laager - A temporary defensive position normally in a circular configuration with all of the weapons pointing out of the circle and the command and support elements in the center.

Mechanized Infantry Battalion - An infantry organization consisting of a Headquarters and Headquarters Company, three rifle companies and a combat support company with a total strength of 850 officers and men. Primary difference between mechanized infantry and straight infantry is the mechanized infantry is 100% mobile and uses armored personnel carriers to move the infantry squads.

Minus (-) - A technique used by the Army to denote a unit that has had a number of members detached. Example: A tank battalion with only two companies would be a tank battalion (-).

Mobile defense - Type of defense used by armor and mechanized forces characterized by the manning of strong points with strong armor reserves as opposed to area type defense used by straight infantry in which a front line is formed and fortifications prepared.

Nerve gas - A deadly chemical agent which affects the nervous system by being absorbed through the skin or inhaled.

POL - Petroleum, oil and lubricants.

PSP - Perforated steel planking used primarily to make runways for temporary airfields. Configured of strips approximately one foot wide by 8 feet long, one side having a series of slots and one side having tabs to lock into these slots. Also used by some tank units in Vietnam to protect the tank from RPG fire.

RRF (Ready or Rapid Reaction Force) - A unit designated to quickly assist another unit or location in the event of an attack on the other unit.

Steering laterals - Two metal handles used to steer some types of tracked vehicles such as the M113A1 series vehicles. Also used on older model tanks such as the M-4 series.

Strong point - Used in road security operations in Vietnam to protect a road and its traffic. May consist of a single tank, a rifle section or squad or a combination of each.

Tactical Area of Responsibility (TAOR) - That area within which a unit had the following continuing responsibilities to be coordinated as required with local Government of Vietnam authorities both military and civil:

- a. Defense of key installations
- b. Conduct of operations including such reaction operations as are necessary to secure the area against organized military forces.
- c. Support of Government of Vietnam construction and pacification activities as required.

Tank - An armor-protected, track-laying vehicle incorporating a large caliber main gun, and auxillary armament which is used as the Army's primary ground weapons system.

Tank battalion - Main maneuver element of armored forces consisting of a Headquarters and Headquarters Company, a combat support company and three line companies. Each line company has 17 tanks and is commanded by a captain. A tank battalion has 54 tanks and is commanded by a lieutenant colonel. Total battalion personnel strength is 554.

Tank platoon - Smallest integral tank unit consisting of five tanks, 19 men and one officer.

Tanks

M-26 - A medium tank developed late in World War II. The first U.S. tank mounting a 90 mm gun, this tank was still in use in limited numbers during the Korean War.

Crew: 5

Armament: One 90 mm gun, 2 caliber .30 machine guns, 1 caliber .50 machine gun.

Maximum speed: 30 MPH

Weight: 40 tons

Engine: Ford, V-8, 500 horsepower

Cruising range: 92 miles

M-46 - Improved version of the M-26 medium tank. First tank with a pivot-steer capability. (Capability to turn the tank 360° in its own length by one track driving forward and one track driving in reverse--referred to as "neutral steer.") Used extensively in the Korean War.

Crew: 5

Armament: One 90 mm gun, 2 caliber .30 machine guns and one caliber .50 machine gun.

Maximum speed: 30 MPH

Weight: 48.5 tons

Engine: Continental V-12, 810 horsepower, air-cooled.

Cruising range: 70 miles

M-24 - A light tank developed late in World War II, the M-24 saw extensive service during the Korean War. The first U.S. tank committed to Korea but was no match for the heavily armored Russian T-34.

Crew: 5

Armament: One 75 mm gun, 2 caliber .30 machine guns and one caliber .50 machine gun

Maximum speed: 34 MPH

Weight: 20 tons

Engine: Two V-8 Cadillac, 110 horsepower each

Cruising range: 100 miles

M4A3E8 - The most improved model of the M-4 series medium tanks. Mainstay of U.S. armored forces during World War II, the M-4 tanks were manufactured in numerous configurations, but the one's in World War II had a 75 mm gun as their main armament, until the M4A3E8. This tank was still in service in Korea for the entire duration of the war and is still in service today in many allied countries.

Crew: 5

Armament: One 76 mm gun, 2 caliber .30 machine guns and one caliber .50 machine gun.

Maximum speed: 26 MPH

Weight: 37 tons

Engine: Ford V-8, 500 horsepower

Cruising range: 100 miles

T-34 - A Russian medium tank of World War II vintage, this tank spearheaded the advance of the North

Korean invasion of South Korea and was used by the North Vietnamese against South Vietnam.

Crew: 5

Armament: One 85 mm gun and two 7.62 mm machine guns

Maximum speed: 33 MPH

Weight: 34.4 tons

Engine: Model V-2 diesel, V12 500 horsepower

Cruising range: 225 miles

T-54 - Russian medium tank developed in early 1950's as a replacement for the T-34. Currently in use in many Soviet armor units and in other Soviet satellite armies along with the improved version, the T-55. Used by the Egyptians and Syrians against Israel and by the North Vietnamese against South Vietnam.

Crew: 4

Armament: One 100 mm gun, one 7.62 mm machine gun (some models have two) and one 12.7 mm machine gun

Maximum speed: 31 MPH

Weight: 40 tons

Engine: V-12 diesel, 520 horsepower

Cruising range: 250 miles without auxillary fuel tank, 375 miles with auxillary fuel tanks

PT-76 - A Soviet light, amphibious tank currently in the inventory of the Russian Army and used by the North Vietnamese in South Vietnam.

Crew: 4

Armament: One 76 mm low velocity gun and one 7.62 mm machine gun

Maximum speed: 40 KPH

Weight: 14 tons

Engine: Model V-6 in line diesel, 240 horsepower

Cruising range: 250 kilometers

M48A3 - An improved version of the U.S. M48; first produced in 1953, the M48A3 was the primary weapon of U.S. tank battalions and armored cavalry units in Vietnam. Replaced in armored cavalry units by the M-551 Sheridan in 1969, the M48A3 Patton remained in tank battalions throughout the U.S. involvement and many were issued to the South Vietnamese Army when the Americans withdrew. Currently in use in some National Guard and Reserve units, the M48A3 is being upgraded to the M48A5 configuration which replaces the 90 mm gun with a 105 mm gun.

Crew: 4

Armament: One 90 mm gun, one 7.62 mm machine gun and one caliber .50 machine gun

Maximum speed: 32 MPH

Weight: 50 tons

Engine: Continental V12 diesel, air-cooled, 750 horsepower

Cruising range: 300 miles

M60A1 - Current main battle tank of the U.S. Army, the M60A1 is actually an evolutionary improvement of the M-48 series tanks incorporating a larger turret.

Crew: 4

Armament: One 105 mm gun, one 7.62 mm machine gun and one caliber 50 machine gun

Maximum speed: 30 MPH

Weight: 53 tons

Engine: Continental V12 diesel, air-cooled, 750 horsepower

Cruising range: 310 miles

M-551 AR/AAV Sheridan - A light, amphibious, air-droppable tank currently used by U.S. armored cavalry units. This lightly armored vehicle incorporates advanced technology in both fire control and weapons systems and is constructed of aluminum. It is the world's first tank capable of firing a guided missile and conventional ammunition from the same gun. Used in Vietnam by U.S. armored cavalry

units minus the missile capability. Also used by the only light tank battalion in the U.S. Army, 4th Bn, 68th Armor, stationed at Fort Bragg, NC.

Crew: 4

Armament: One 152 mm gun/launcher firing the Shillelagh missile and conventional ammunition, one 7.62 mm machine gun and one caliber .50 machine gun

Maximum speed: 43 MPH

Weight: 16 tons

Engine: Detroit diesel V6, 225 horsepower

Cruising range: 373 miles

M-36 Tank Destroyer - A World War II weapons system designed to penetrate the heavily armored German tanks. This vehicle is a tank in every respect except the name. The only significant physical difference between the tank and the tank destroyer (except gun size) was the tank destroyer had an open-top turret. The term tank destroyer is no longer used by the U.S. Army.

Crew: 5

Armament: One 90 mm gun and one caliber .50 machine gun

Maximum speed: 30 MPH

Weight: 31 tons

Engine: Ford V8, 500 horsepower

Cruising range: 150 miles

Task Force - In Army terminology, a number of units combined under one commander for a specific mission at battalion level or higher.

TO&E (Table of Organization and Equipment) - A Department of the Army document which provides a detailed list of personnel and equipment authorized for a unit. Personnel are listed by rank, number and military specialty. Each type unit is organized under a different TO&E. Example: A tank battalion TO&E is 17-35, a tank company, 17-37.

Track block - One section of a tank track. A new track, for the M-60 series tanks is made up of 33 track blocks.

Weapons

M-72 Light Antitank Weapon (LAW) - A shoulder-fired antitank rocket which uses a disposable launcher. Each rocket is packed in a fiber tube used for the launcher. This 66 mm rocket uses the shaped charge principal for armor penetration. Accuracy depends on the proficiency of the user but in

most cases is limited to a range of 100-150 meters even though performance characteristics state 300 meters. Penetration capabilities are supposed to be 12 inches of steel but did not prove out in Vietnam.

81 mm Mortar - An indirect-fire weapon organic to the infantry. May be hand carried and ground mounted, or mounted in a tracked vehicle. Fires a variety of ammunition to include high explosives, white phosphorous, and illumination. Has a maximum range of 3,500 meters.

106 mm Recoilless Rifle - A direct-fire, infantry weapon normally mounted on a jeep and used primarily as an antitank weapon. Uses a ventilated breech which allows the burning gases of the propelling charge to escape to the rear as the projectile leaves the muzzle of the weapon eliminating most of the recoil of firing. In addition to firing antitank projectiles, this gun also fires anti-personnel ammunition. Now obsolete, the 106 recoilless rifle has been replaced by an anti-tank missile system in the active army.

RPG-2 and 7 - A Soviet shoulder-fired antitank rocket which uses a shaped-charge principal for armor

penetration. Primary antitank weapon used by the VC/NVA in Vietnam against tanks and defensive positions. RPG-2 is the early version and the RPG-7 a later, more potent version.

	<u>RPG-2</u>	<u>RPG-7</u>
Caliber:	80 mm	85 mm
Effective range:	165 yards	555 yards
Penetration:	6-7 inches	12.6 inches

Quad 50's - Four .50 caliber machine guns mounted in a box-like configuration with two guns in an upper position and two in a lower position. These guns were used in Korea mounted in the rear of a half-track and in Vietnam mounted on a five-ton truck.

APPENDICIES

APPENDIX A

CAPABILITIES AND LIMITATIONS OF ARMOR

Limitations

Whenever a nation's armed forces develop a new weapon other nations are soon busy building a weapon to destroy it. Thus, for every weapon system on the battlefield today there is a counter-weapon system. Current state-of-the-arts is such that technology has not developed a perfect weapons system.

Just as the tank has many capabilities it also has many weaknesses. There are a number of weapons which can disable or destroy it. Among these are: another tank, antitank guns, missiles with High Explosive Anti-tank Warheads fired from the ground or air, napalm or other fire-producing devices, and antitank mines.

It must be understood that tanks, just as aircraft and warships, come in various sizes and shapes with different degrees of armor protection, firepower, speed, and weight. A weapon that may destroy a light tank may have little or no effect on a more heavily armored tank. Therefore, capabilities and limitations discussed here will be in general terms.

Antitank projectiles fall into two categories, Kinetic energy projectiles and chemical energy projectiles. Chemical energy projectiles are fired by a number

of weapons including tank guns. All antitank missiles utilize chemical energy. When a chemical energy device hits a tank, there are varying degrees of effect depending on the location on the tank's surface that has been hit. These effects fall into four general categories. One effect would be when the projectile hits the crew compartment, penetrates the armor and hits the basic load of main gun ammunition in the turret causing a catastrophic explosion which destroys the tank and usually kills the crew. If the projectile penetrates the crew compartment and does not hit the ammunition, there may be only minor damage and injuries depending on the size of the projectile. A hit in the engine compartment may cause a fire in the fuel cells and destroy the tank or merely damage the engine rendering the tank immobile. A hit on the suspension system may also render the tank immobile or only do minor damage. Finally, a hit on the tank's exterior may do only minor damage to exterior components but have no effect on the tank's fighting ability.

Kinetic energy projectiles are normally the more deadly especially against the crew compartment. When a kinetic energy projectile penetrates the tank's armor it does so by sheer mass and velocity. As the projectile enters the turret it will break off large pieces of the

tank's armor and throw it around inside the turret like jagged projectiles killing or wounding the crew and destroying most of the interior turret components. In the U.S. today, only a tank fires a large caliber, kinetic energy projectile. Other countries have both towed and self-propelled antitank guns which fire kinetic energy, especially the Soviet Union.

Napalm can destroy or disable a tank in two ways. A direct hit by napalm can destroy the tank and the crew by burning. A near miss may do only slight damage to the tank but suffocate the crew due to the sudden lack of oxygen created by the intense burning of the napalm. This weapon is normally delivered by aircraft but there are tanks and armored personnel carriers which mount flame throwers using basically the same chemical mixture as air-delivered napalm. Infantrymen also have a back-pack flame thrower but the limited range and quantity of this smaller flame thrower is not as effective against a tank as the larger systems.

Antitank mines come in a number of sizes and configurations and most are designed to disable, not destroy, a tank. Usually the mine will destroy a section of the tank's track and a number of roadwheels, shock absorbers and other suspension components. There are mines, however, that will destroy a tank. This type of mine incorporates

a large shape charge similar to the type used in large anti-tank missiles and are planted in such a manner to explode under the belly of the tank which is one of the most lightly armored parts of the vehicle. Size and shape of non-standard mines are limited only by the imagination and resources of the user. In both Korea and Vietnam there were a number of non-standard mines fabricated using unexploded artillery projectiles and air force bombs. In the Korean War, a number of huge mines were made from a 55-gallon oil drum filled with TNT and with a standard anti-tank mine on top as a detonator. A tank unfortunate enough to run over this mine was usually destroyed. Mines are very effective antitank weapons because they are difficult to detect and cause considerable delay to the tank while the mine damage is repaired.

There are a number of other limitations to the tank. Visibility for the crew has always been a problem. When the tank has all the hatches closed, called "buttoned up," there is a dead space up to thirty feet around the tank that cannot be observed. Infantry in foxholes possessing antitank weapons may be bypassed unobserved and fire on the tank from close range. This is another reason why tanks do not like to operate singly since tanks within a unit can observe the dead space around another tank.

It is also one of the reasons it is important to have the combined tank-infantry teams in order that the infantry can help to protect the tank.

Vision for the tank crew is also a problem during inclement weather conditions. Freezing rain, snow, frost, dew and mud can cover the crew's vision devices, forcing at least the tank commander to expose himself at an inopportune time. It should be emphasized at this point that the crew, and especially the tank commander, normally operate in the open hatch position. Hatches are usually closed when the tank is under intense small arms, automatic weapons or overhead artillery fire. During target engagements, especially against other tanks, the tank commander will usually be exposed. When the main gun is fired the driver must be buttoned up to avoid the severe blast and concussion since he is positioned immediately behind the muzzle of the gun when firing to the front.

Severe terrain conditions can slow or even stop a tank. Examples of severe terrain are mountains, unfordable waterways, dense forrest with trees very close together and of sufficient diameter to prevent the tank from smashing its way through, and marshy areas with non-supporting soils. This should not be confused with unfavorable terrain such as jungles, rice paddies, hills

or forrested areas such as rubber plantations and the like. This type of terrain, as in Vietnam, can be negotiated by proficient tank crews following the guidance of competent leaders.

Armor and mechanized units require massive logistical support. They consume great quantities of fuel and lubricants, require thousands of tons of spare parts, and fire tons of ammunition. They require maintenance support units staffed with competent specialists and they are equipped with high dollar items. This is also true of air and artillery units, but in many cases artillery and aircraft are an integral part of an armored organization, which contributes to the logistics and maintenance problem. Tanks are heavy and cannot be rapidly deployed in mass other than by rail or sea lift even though the U.S. Air Force C-5A cargo aircraft can carry two tanks a given distance in an emergency. Nevertheless, it would require the entire C-5A fleet to quickly lift a tank battalion and its supporting elements to a battle area.

Training for tank crewmen requires almost twice as much time as training an infantryman. Attaining a significant degree of proficiency takes even longer once a crewman has been taught the basics. While current army training schedules allocate a similar amount of time to

train infantry and armor, there are a considerable number of subjects that could be deleted from both schedules on an emergency basis. Armor would still require longer training time even in an emergency.

Armor also requires much larger training areas than infantry to become proficient as a crew. Within the continental United States there are only a handful of training areas that will accommodate tank training, particularly for firing all of the types of ammunition used by the tank's main armament. Infantry on the other hand can become proficient in most of their weapons and tactics in relatively small training areas.

Capabilities

On the plus side, the tank can be destroyed by only about three percent of the weapons on the battlefield while an infantryman can be killed by 100 percent of the weapons. Survivability and effectiveness of the tank is enhanced by a well trained aggressive crew. Of all the weapons in the world arsenal today, only the tank is capable of movement at high speeds over rough terrain, of sustaining hits from large caliber guns and surviving to deliver its firepower on a target. No other system combines the elements of direct fire power, armor protection, shock effect and mobility into one weapon.

Nuclear weapons have multiplied the tank's importance significantly. Armor has the ability to remain dispersed to avoid presenting a favorable nuclear target and yet quickly be moved to an area of concentration for offense or defense. Protection provided by the tank's armor stops or significantly reduces the effect of radiation allowing a tank to pass rapidly through a contaminated area with only minimum doses of radiation to the crew. A tank can withstand a considerable amount of blast from a nuclear weapon without being destroyed. A tank crew buttoned up and utilizing the tank's collective protection systems can survive the fallout of chemical nerve agents and other chemical munitions which would incapacitate or kill a foot soldier even when he wears a protective mask.

A tank that strikes a mine is usually repairable and protects the crew from serious injury, which is not the case with the infantry or wheeled vehicles. Logistics, training, strategic movement and expense may be handicaps to the tank, but the effectiveness of this weapon's system on the battlefield far outweigh these shortcomings. Other weapons with less effectiveness have many of the same problems.

APPENDIX B

ARMOR DOCTRINE

An Infantry Support Weapon

American tank development was considerably behind that of England and France, consequently by the end of World War I, U.S. tank units had very few tanks available to them. No American-made tanks were produced in time to be used in combat. American tank units fought briefly and were so fragmented during the war that it was difficult for American tank officers to arrive at any definite conclusions concerning tank employment. British and French tanks had been used in sufficient numbers, however, to impress some American commanders with their effectiveness. Experience by a few of these military men led them to believe that the tank would be most effective when employed in mass.⁶⁴

First employment of tanks by the British had been in a frontal assault role, as mentioned previously, to smash through barbed wire and destroy enemy machine gun emplacements. Only shallow penetrations were made in the first assault but at Cambrai in 1917 the tanks achieved a tactical breakthrough. This success was

⁶⁴ Stubbs, Mary Lee, and Connor, Stanley Russell, Armor-Cavalry, Part II: Army National Guard, Office of the Chief of Military History, United States Army, Washington, D.C., 1972, p. 48.

limited by a lack of forces capable of exploiting the breakthrough since cavalry was even more vulnerable to the German machine guns than the infantry.

Colonel Fuller, quickly grasping the tank's potential, developed the "1919 Plan," mentioned in the first chapter, which expanded the role of the tank. Fuller's plan called for both heavy and medium tanks. Mediums would be sent around the flanks to destroy command post, artillery and supply points while the heavies conducted a frontal assault followed by additional mediums which would exploit the success of the heavies along with truck-mounted infantry.⁶⁵

World War I ended before this plan could be put into effect, but the French had also arrived at the concept of two different types of tanks for different missions. Since the French had produced a great number of light Renault F-T tanks, their plan had these light tanks accompanying the infantry after a breakthrough by heavy tanks. This system, in part, was adapted by the Americans who built a light tank copied after the French Renault and a heavy tank similar to the British-designed Mark VIII.⁶⁶

⁶⁵Ogorkiewicz, Richard M., Armor, A History of Mechanized Forces, Frederick A. Praeger, New York, 1960, pp. 115-116.

⁶⁶Ogorkiewicz, p. 117.

Russian doctrine of the period expanded French tactics to include three different types of tanks instead of two. This doctrine more closely resembled Fuller's "1919 Plan." There would be a light support tank to accompany the infantry, a medium tank to act more independently of the infantry and penetrate deeper, and a heavier tank to penetrate enemy territory destroying command post and artillery positions.⁶⁷

Although the French and Russian tactics were advanced over those used during World War I, they were still infantry support tactics tied to the pace of the foot soldier. It was the British who made the first significant breakthrough in tank tactics when, in 1927, they organized a mechanized brigade consisting of four tank battalions and a headquarters. Prior to this time, the tank brigade headquarters had no control over the maneuvering of tanks. They, in fact, acted as advisors after providing their tanks to another unit. Under the British concept, this would be changed and the brigade headquarters would tactically direct their battalions.⁶⁸ Only tank battalions were organic to this brigade. Its intended

⁶⁷Ogorkiewicz, p. 115.

⁶⁸Macksey, Kenneth, Tank Warfare, Stein and Day, New York, 1972, pp. 79-80.

mission was for action against the flanks, harrassing raids and exploitation. A lack of other arms, especially infantry, in the brigade limited its ability for independent action. They were to be used through a gap created by other forces and not for breakthrough. Soviet mechanized brigades and the American cavalry brigade of the period were envisioned in a similar role.

In spite of the different experiments conducted in tank employment by various countries, tank doctrine remained essentially unchanged from World War I to World War II since the tank's primary mission was "...to facilitate the uninterrupted advance of the rifleman in the attack."⁶⁹ Tanks were still tied to the slow pace of the infantry and were still parcelled out a few to each infantry unit.

Armor in the Leading Role

It wasn't until the German Blitzkrieg through Poland in September 1939 and through France in 1940 that a dramatic change occurred in armor doctrine.

German panzer divisions were organized with a combined arms team concept in which the tank played the

⁶⁹Stubbs, Mary Lee, and Connor, Stanley Russell, Armor-Cavalry, Part I, Office of the Chief of Military History, U.S. Army, Washington, D.C., 1969, p. 50.

principal role. This division was designed for breakthrough and exploitation. Tanks were not assigned to infantry units in piecemeal-fashion and the entire division was geared to the speed of the tank and not the infantry. Tank forces were concentrated at a point for breakthrough and were followed by a motorized infantry brigade. French doctrine still had the tank in an infantry support role and piecemealed to the infantry. At any time and place therefore, the German tanks overwhelmed the French by greater tank strength. So rapid was the movement of the Panzer Divisions that there was little time for the French to establish any significant defense once the breakthrough occurred.

Poland had only two battalions of nine-ton tanks, armed with 37 mm guns, and still depended on horse-mounted cavalry and straight infantry for defense. They were also very short of antitank guns.⁷⁰ Swift movement by the panzer divisions gave the Poles little hope. Horses and sabres were no match against tanks.

In the U.S., the rivalry between cavalry and infantry for control of the tank was resolved in 1940 when General George C. Marshall, Army Chief of Staff, authorized

⁷⁰ Hart, Liddell, The Tanks, Vol. II, 1939-1945, Frederick A. Praeger, New York, 1959, p. 4.

the formation of the Armored Force as a separate arm.⁷¹ Undoubtedly, the German Blitzkrieg exerted considerable influence on Marshall. That same year the American army demonstrated armor's effectiveness by practically dominating a simulated battlefield with three tank and mechanized brigades during maneuvers in Louisiana.

From the outset the armored division was organized as a large combined arms force. Initially, their mission was visualized as a rapid striking force which would penetrate weak points on the flanks and drive deep into the enemy's rear destroying command and supply installations. As the Second World War progressed and experience was gained, the armored division's mission was expanded to encompass almost every conceivable mission to include breakthrough, pursuit, exploitation raids into enemy territory and even fighting in cities. There was no clear cut point in time as to when armored divisions expanded their mission. Rather it was usually a reflection of the imagination, ingenuity and audacity of the commanders. Necessity often was at the root of a decision to use armor in a particular role plus the gradual

⁷¹Macksey, Kenneth, Tank Warfare, Stein and Day, New York, 1972, pp. 132-133.

realization by the planners that the armored division was, in fact, well suited for practically any type mission. By the end of the war, armor was the main striking force of the ground army.

Tactics and doctrine changed very little in the post-war years except in the defense. With the advent of mass destruction weapons it became obvious that a well established defensive line was a thing of the past. Actually armor formations had already made a static defense impractical unless the defense was reinforced by strong tank and mechanized forces, but nuclear weapons made it suicide. It was necessary to have an area defense only in certain areas in which terrain severely restricted the movement of tanks. Other areas were defended by mobile strong points which would attempt to canalize an enemy into a killing zone and then use tank-heavy forces to hit the enemy on the flank with artillery and air support saturating the same killing zone. This tactic remains essentially the same today with only slight variations.

When the U.S. became involved in Vietnam in 1965, armor doctrine was essentially that emerging from World War II. As mentioned earlier, the helicopter had led to the formation of an air cavalry division which moved infantry and artillery by air, but armor was not involved

in the air cavalry division. Dismounted infantry divisions were still employed in an area defense with some of their tanks in the defensive posture and others constituting part of the division's reserve.

As previously stated, armor's mass employment in World War II left the impression on many that tanks could only be used in an environment where they would be employed as they had been in Europe. Once committed to Vietnam, armor proved this assumption incorrect.

Armor Doctrine in Vietnam

Armor doctrine did not really change significantly in Vietnam, only the manner in which it was applied. If, for example, one examines the mission of the tank battalion as stated in army publications, they will find a very general statement: "To close with and destroy enemy forces using fire, maneuver and shock effect."⁷² Certainly the tank battalion performed this mission in Vietnam. While application of this mission statement may normally have been visualized in a conventional battle area with clearly delineated front lines, it is, nonetheless, applicable in any war zone where armor is employed. Search and destroy operations in a counterinsurgency

⁷²Armor Reference Data, p. 119.

movement may culminate in an attack by a reinforced tank battalion just as a preplanned attack on a fortified position in a conventional war. Security operations in Vietnam were primarily defensive in nature but may also result in an attack or counter-attack by a tank force. Tactics may be changed to adapt to a particular situation, but this is true whether it is in fighting guerillas or conventional forces. It is sound tactics, arrived at through experience, that tanks advancing through a wooded area are normally preceded by infantry to protect the tanks from antitank weapons. In Vietnam it was necessary to reverse this role in dense jungle to allow the tanks to detonate booby traps and mines that could injure or kill a foot soldier.

In Europe, Africa, or North America, an offensive operation may be conducted by using infantry to push against an enemy while tanks attack the flanks in a pincer movement to trap the enemy force. With the proliferation of helicopters and their inherent speed, tanks may be used to bring pressure against an elusive enemy with infantry being air inserted to close the trap.⁷³

⁷³West, Arthur L., Jr., MG, and Starr, Donn A., Col., "Armor in an Area War," Armor Magazine, Washington, D.C., September-October 1968, p. 36.

A tank battalion or armored cavalry squadron acting as a ready reaction force closely approximates the actions of a counterattack in conventional warfare. By the same token, the use of an armored cavalry squadron as a maneuver battalion is, in itself, a variation of doctrine since this type unit is not considered a maneuver battalion. In Vietnam, however, it performed this mission most effectively.

Vietnam marked the first time in modern history that the U.S. Army fought a counter-guerilla war. How well they fought was to a great extent due to the adaptability and flexibility of the American soldier in general and the U.S. armor forces in particular. Doctrine is only a tool and as such must not dominate the user but rather serve the user's needs. So it was in Vietnam. Armor doctrine provided a sound basis on which to build experience and was modified when required.

Use of Armor by Other Countries

There is very little difference in U.S. armor doctrine and that of the major western countries. Some organizational differences exist but the use of armor in combined arms teams appears to be universal. Countries such as France and Israel organize their armor by separate brigade instead of divisions, as in the U.S., and have tanks and mechanized infantry assigned to the same

battalions instead of separately. In a French brigade, for example, there are two mechanized infantry battalions and one tank battalion. Each mechanized infantry battalion has four tank companies and one mechanized infantry company.

Israeli organization bears some similarity to the French in that an armor brigade has three tank battalions with each battalion consisting of three tank and one mechanized company. Israeli mechanized brigades, however, have one tank battalion of four tank companies and two mechanized infantry battalions with three mechanized companies each. There is a higher ratio of tanks to infantry in the French and Israeli armies than in the U.S. army.

Missions and method of employment are essentially the same as the U.S. All three countries employ tanks as a mobile strike force to counterattack against penetration in a defensive line or as a spearhead element in the offense.⁷⁴

West German armor units more closely resemble U.S. armor units in organization. Each tank battalion

⁷⁴Kirkland, Wade, Maj., How to Fight Task Force, personal interview, U.S. Army Armor School, Fort Knox, KY, 16 March 1976.

has 54 tanks and are organic to brigades and divisions. Mission statements for German and U.S. tank battalions are identical. "To close with and destroy enemy forces using fire, maneuver and shock effect." One minor difference in employment techniques between the two armies is that the Germans are more likely to employ their tank units pure and attach infantry only when necessary. Additionally, if a particular mission dictates the need for tank-infantry task forces, a tank battalion may be given a mechanized infantry company but not lose a tank company to the infantry. U.S. units normally cross-attach tanks and infantry.⁷⁵ Missions of British armor units are also generally the same as the U.S. Only the wording of the mission statement differs somewhat: "Aggressive mobile action to destroy enemy armor, close combat in conjunction with infantry and exploitation of shock action."⁷⁶

British tank battalions, called "reiments" by the British, are separate units not assigned to divisions as they are in the U.S. Employment is the same

⁷⁵Interview, Totten, James P., Captain, U.S. Army Armor School, Fort Knox, KY, 16 March 1976.

⁷⁶Interview, McIntosh, Andrew K., LTC, Fourth Royal Tank Regiment, British Exchange Officer, U.S. Army Armor School, Fort Knox, KY, 16 March 1976.

as the U.S. however. Normally, British armor is task-organized into brigade size units with either two tank regiments and one mechanized infantry regiment or two mechanized infantry regiments and one tank regiment.

Thus, it can be seen that the use of tanks in the western world differs very little between countries. Mission statements usually include the main characteristics of the tank, namely to destroy the enemy by their firepower, mobility and shock effect.

Philosophy of tank development may vary between countries in that there is a difference of opinion as to weight, speed, armor-thickness and gun size but most countries agree that the tank is a highly effective weapons system which can be decisive in a ground war and is most effective when employed in mass in conjunction with infantry, artillery and air power.

APPENDIX C

ATTITUDE OF THE INFANTRY

Since the tank's introduction onto the battlefield, there has been a rivalry between tanks and infantry. The intensity of this rivalry varies from good-natured jibs to acrimonious resentment depending on a particular infantryman's experience with and knowledge of tanks. Tankers may also have a poor opinion of the infantry in much the same way, based on their association, or lack of it, with the infantry.

This tank-infantry relationship is somewhat analogous of the relationship between the United States and some countries that have received financial aid from the U.S. A particular country may fully understand their need for aid but resent the U.S. for being in a position to supply it. So it is, to a degree, with tanks and infantry. Both are aware of the need for the other but may resent this, wishing instead that they could accomplish the job alone.

Most members of both branches fully realize the need for and effectiveness of the tank-infantry teams. There is also little doubt of the increased effectiveness of armor and mechanized units over dismounted infantry organizations. This fact is evident in the current structure of the army which has practically eliminated straight

infantry divisions in favor of mechanized divisions.

On an individual basis, the majority of infantry fully appreciate the value of tanks and prefer to work with tanks rather than alone. This is especially true of infantry commanders in Vietnam that were supported by tanks.

In an After Action Report, one infantry brigade commander paid tribute to tanks when he described the size of an infantry force required to defend a position with or without armor. According to Colonel Sidney B. Berry, Jr.,: "...An infantry battalion is the smallest unit that-- unsupported by armor--can be expected to withstand successfully a prolonged, all-out attack by main force battalions."

"The presence of armor in a defensive position changes the situation. An American rifle company which is well dug-in, reinforced with armor, and well supported by artillery and air can survive the attack of an infantry battalion or even a regiment."⁷⁷

Other infantry officers expressed the opinion that they would prefer to work without tanks because the noise

⁷⁷Berry, Sidney B., Jr., Col., Infantry, Operational Report, Lessons Learned, Observations of a Brigade Commander, 1st Brigade, 1st Infantry Division, June 66 - February 67, Headquarters, 1st Infantry Division, 27 December 1967, p. 25.

of the tanks attracted too much attention and often masked the noise made by the enemy. In the majority, however, were the infantry officers who believed the disadvantages of tanks were far outweighed by the tank's firepower and psychological effect on the enemy.

Representative of a number of infantry officers interviewed was the attitude expressed by Major Robert W. Higgins of Fort Hood, Texas. Major Higgins had two tours in Vietnam with the infantry and worked with armor both as an infantry platoon leader and as an infantry company commander.

While commanding an infantry company, Higgins was often cross-attached to the 1st Squadron, 4th Armored Cavalry and with elements of the 11th ACR. On the negative side, Higgins criticized the action of the tankers while working with infantry because of the indiscriminate use of firepower which often inflicted as many casualties on the friendly infantry as it did on the enemy. This was particularly true when operating in dense vegetation when the tankers would lose sight of the infantry. If one enemy soldier fired on the tanks they would fire in all directions often hitting the friendly soldiers. Higgins attributed this reaction to a lack of tank-infantry training.

In a night defensive position, the tankers were criticized for their lack of noise discipline by dropping tools, slamming tank access doors and generally revealing the location of the friendly unit.

On the plus side, Higgins praised the tanks for their firepower and shock action against the enemy. On one occasion a tank force rescued Higgins' unit in the Michelin Rubber Plantation when no other unit could get to them. When asked what would have happened if only infantry had been available to rescue them, Higgins replied: "They couldn't have made it--we would have been wiped out."⁷⁸

Another infantry officer, Captain Robert A. Neely, also complained of the tanks indiscriminate use of their firepower. Neely said that tanks establishing a night defensive position would fire all around their position without regard to other units working in the same area and would often inflict casualties on other friendly forces. Such actions, according to Neely, frequently alienated infantry against tanks.⁷⁹

⁷⁸ Interview, Major Robert W. Higgins, Infantry, Executive Officer, 2d Battalion, 58th Infantry (Mechanized), Fort Hood, TX, 12 March 1976.

⁷⁹ Letter, Captain Robert A. Neely, Infantry, to Chief, Armor Monograph Team, Fort Knox, KY, 20 May 1974, Armor Monograph Files, Patton Museum, Fort Knox, KY.

These unfortunate experiences could have been prevented by proper training and coordination on the part of the tank unit commanders.

Presently, the Armor School at Fort Knox and the Infantry School at Fort Benning, Georgia, are collaborating on a series of training manuals which should do a great deal toward standardizing tank-infantry operations and increasing the understanding of each branch for the other.

APPENDIX D

EQUIPMENT MODIFICATIONS IN VIETNAM

American troops in Vietnam soon realized that a number of modifications to equipment were needed as well as a change in conventional tactics and techniques. Many of the problems were known prior to Vietnam, but such obstacles as funds, dogmatism and peacetime restrictions prohibited necessary changes. One vehicle, the M-114 Command and Reconnaissance vehicle, was totally unsatisfactory from its inception and performed poorly in the U.S., Germany and Vietnam resulting in the vehicle being totally removed from the war zone. Most changes were not as drastic.

M48A3 Tank: When first developed, the M48 tank was equipped with an externally mounted caliber .50 machine gun. This was later replaced with the M-1 cupola which was unsatisfactory. Problems were caused by the limited interior space, limited amount of ammunition readily available (50 rounds in a small box), difficulty of loading, links from the belt jamming in the ejection chute, extreme difficulty in mounting and frequent stoppages. In Vietnam, the caliber .50 was removed from the cupola and mounted externally on a pedestal or tripod mount.

To reduce the effectiveness of enemy RPG rounds, extra track blocks were bolted to various places on the

turret. Perforated steel plates were often welded to the side of the tank, like fender skirts, for the same reason.

Jungle busting was a new experience for most American tankers. To enhance the crushing ability of the tank, often the edge of a bulldozer blade was mounted across the front of a tank.

M113A1: Probably the most versatile armored vehicle in the U.S. inventory, the M113A1 was modified extensively. To help offset the effects of antitank mines, an additional layer of armor was added to the bottom of the vehicle. Known as Belly Armor, a titanium plate covered the bottom of the driver's and crew compartments.

A boom hoisting device was added to enable the M113A1 to assist in maintenance missions when other recovery vehicles were not available.

To give the M113A1 a self-recovery capability, a Capstan and cable kit were added. This was a simple device consisting of a perforated steel drum attached to the sprocket of the vehicle. With a cable threaded through the capstan and anchored to a "dead-man," the driver simply applied power to the vehicle and as the sprocket turned the cable wound around the capstan pulling the vehicle forward.

Undoubtedly, the most significant modification to the M113A1 was the additional armament and gun shields which changed the M113A1 to a configuration known as the ACAV or Armored Cavalry Assault Vehicle. Originally, armed with only one caliber .50 machine gun and carrying an infantry squad, the ACAV added an M-60, 7.62 mm machine gun to each side of the vehicle. Armored shields were placed around these guns and the caliber .50 for additional protection. A grenadier with an M-79, 40 mm grenade launcher was positioned at the rear. In this configuration, the ACAV was issued to armored cavalry squadrons and the reconnaissance platoon of the tank and mechanized infantry battalions and employed in a role similar to a light tank.

A modification employed on a limited basis was the addition of a scissors-bridge system to the M113A1. This vehicle could go where the standard, heavier armored vehicle launch bridge could not and extended the operating capability of all M113A1 series vehicles.

Casualties from mines led to another M113A1 modification. A kit was developed which extended the steering laterals out of the driver's compartment. This allowed the driver to sit on the outside of the driver's compartment. Infantry squads normally riding inside the

carrier chose to ride on the outside top preferring the risk of small arms and automatic weapons fire to the mine explosion.

This steering device was normally used when driving over roads not previously cleared of mines. Riding topside by the squad was much more widespread.

Rome Plow: Dense jungle, tall grass and woods provided the VC/NVA with an ideal hiding place. To destroy these sanctuaries, American forces started cutting areas of dense growth. An off-the-shelf commercial item known as a Rome Plow provided the best means of accomplishing this task. A caterpillar-type tractor was equipped with an angled shearing blade to cut small to medium trees at ground level. Large trees were split by a wedge-like projection at the left end of the blade to weaken them and then were cut down by the blade. This device was considered twice as effective in this role as a standard bulldozer.

Mine Rollers: In Vietnam, a number of attempts were made to reinvent the wheel. Any number of makeshift roller devices were fabricated, none of which were practical. Since a heavy wheeled vehicle exerts a greater ground pressure than a tracked vehicle, previously damaged trucks loaded with laterite soil were pushed in

front of a tank to explode mines. Nothing was 100 percent sure but this system worked better than most. There was no simple solution to mines. It remains an unsolved problem which warrants extensive research.

In an attempt to counter enemy mine warfare, U.S. forces in Vietnam reverted to the past. While electronic mine detectors are of little value against nonmetallic mines or mines buried over 18 inches deep, a number of mechanical mine rollers were used fairly successfully in World War II. One such device was a conglomeration of heavy rollers pushed by a tank. If the device detonated a mine, a roller, or a number of rollers, were blown off but could be replaced. Another, probably more effective, system used a large drum to which a number of heavy chains were attached. This system was mounted on the front of the tank. As the tank moved the drum rotated striking the ground with the chains. Mine detonation merely blew off the chains.

Sand bags: Drivers of both wheeled and tracked vehicles made extensive use of sand bags in an attempt to protect themselves from mines and small arms fire. Windshields on jeeps and trucks were often replaced with a double row of sand bags. Flooring in the vehicles was also sandbagged. Protection afforded

by this innovation was more psychological than physical, especially against mines. Some protection was achieved from small arms, however.

M-551 AR/AAV Sheridan: This vehicle was designed to provide airborne troops with an antitank weapon system and armored cavalry with a light, fast, reconnaissance vehicle. Equipped with the sophisticated Shillelagh missile system, this tank can be air dropped. It is also amphibious, and is also capable of firing conventional ammunition. When deployed to Vietnam, the missile guidance and control system was taken out of the tank since it was scheduled for use by armored cavalry squadrons primarily against dismounted troops and was not expected to fight tanks.

Numerous problems were encountered with the Sheridan, most of which were design failures. Another unique feature of the Sheridan is the consumable cartridge case of conventional ammunition. This highly combustible case usually caused a catastrophic explosion in the vehicle when it struck a mine. To improve the mine protection, a belly kit similar to that for the M113A1 was produced. While not entirely successful it did reduce the number of vehicles totally destroyed by mines.

A gun shield for the commander, also similar to

the M113A1, was added to increase protection against small arms fire.

In spite of all the shortcomings, the Sheridan was a very effective weapons system in Vietnam. It could cross rice paddies and other wet areas that would not support a medium tank. Additionally, the 152 mm gun/launcher was devastating when firing canister ammunition.

Most of the weapons modifications made in Vietnam are still used today. Exceptions are sand bagging vehicles, externally-mounted caliber .50 machine guns on the M48A3 tank and the use of PSP as skirts for the tank.

It is interesting to note, however, that the army's newest tank, the XM1, will have armor skirts to protect the suspension system as an integral part of the vehicle.

APPENDIX E

(PLATES)

WAS NOT REPRODUCED

VITA

VITA

Frederick Eugene Oldinsky, Lieutenant Colonel, Armor, U.S. Army, was born July 15, 1931, in Beattyville, Lee County, Kentucky. His parents, Bernard and Agnes Oldinsky, reside in San Antonio. Colonel Oldinsky attended high school in Seoul, Korea, and Fort Knox, Kentucky, where he graduated in 1950. In 1967, Colonel Oldinsky graduated from the University of Omaha, Omaha, Nebraska, with a Bachelor of Education degree.

Colonel Oldinsky is a career Army officer and has served as an instructor at the U.S. Army Armor School, Fort Knox, Kentucky, in various armor units in Germany, Korea, Vietnam, and the United States, and is a graduate of the Command and General Staff College at Fort Leavenworth, Kansas.

Colonel Oldinsky's permanent address is New Orleans, Louisiana.